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# The American Exporter

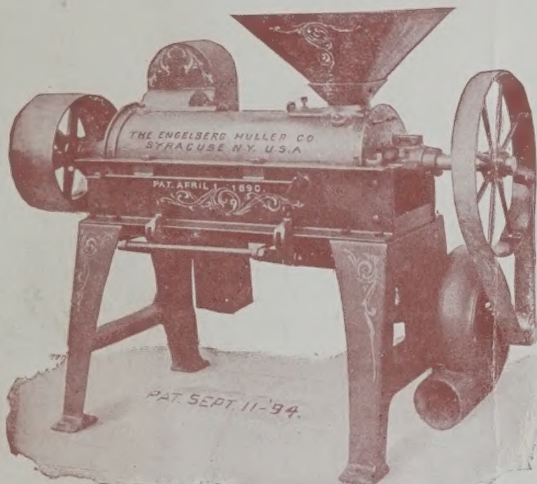
PUBLISHED BY THE JOHN C. COCHRAN COMPANY.

VOL. XXXIX.

NEW YORK, DECEMBER, 1896.

No. 1.

## Rice and Coffee Hulling Machinery



LATEST ENGELBERG COFFEE HULLER.



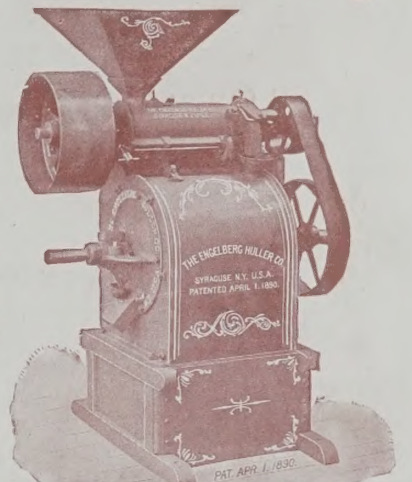
### Our Coffee Huller

Will hull pulped or cherry coffee without breaking or leaving unhulled a single grain. The products will come out clean, polished and free from hulls, ready for bagging, all in one operation. It is the only machine that will grind the hulls fine, so that they may be sucked by the blower through the screen underneath the machine, leaving every grain of coffee inside of the machine, no matter how small it may be.

### Our Rice Huller

Is the only machine that will take rough rice and in one operation make it merchantable. For simplicity, durability and economy has no equal. They are used in plantations, and also in the largest mills. Both the Coffee and Rice Hullers are made of iron and steel, and can be knocked down and packed for mule transportation if desired.

Send for Circular of our New Machines, with Prices and all information.

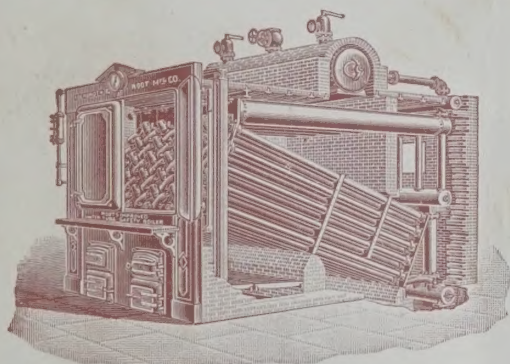


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## ROOT IMPROVED WATER TUBE BOILER

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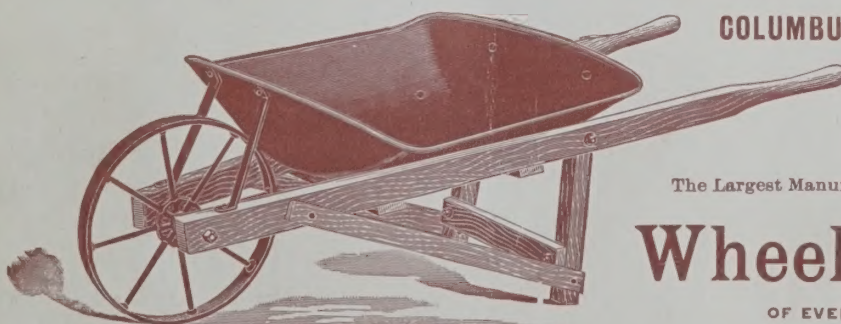
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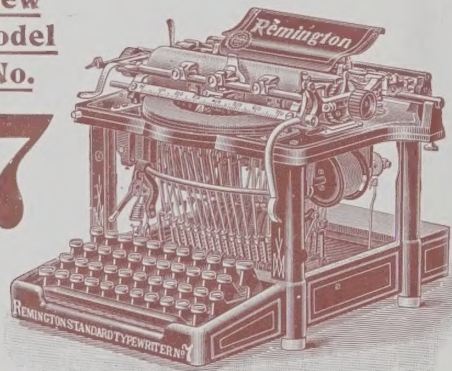
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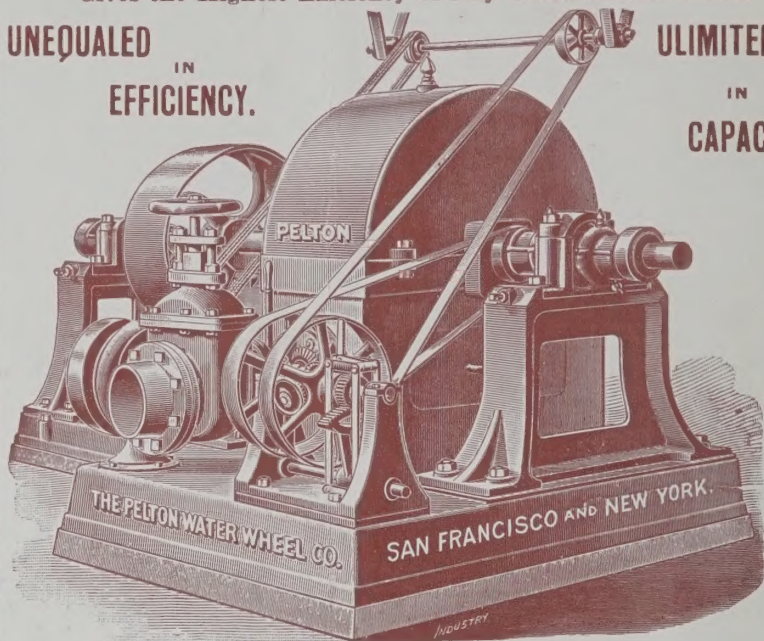
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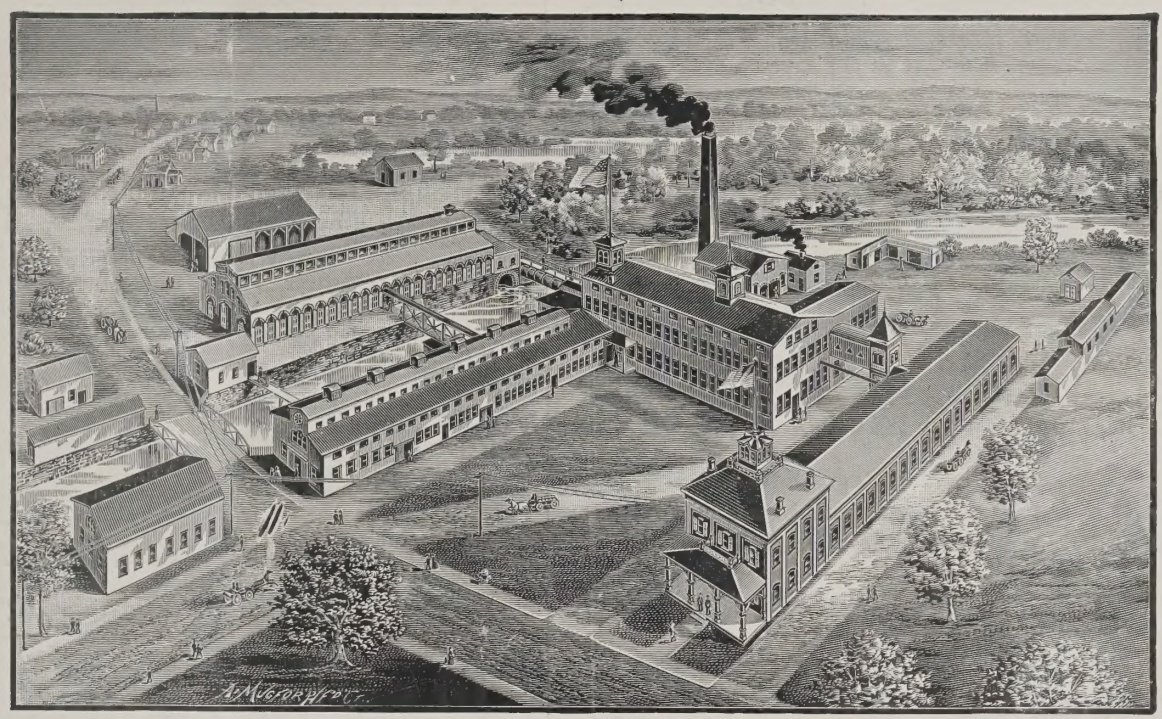


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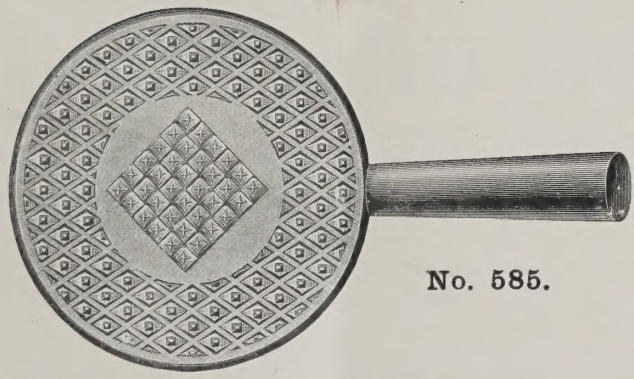
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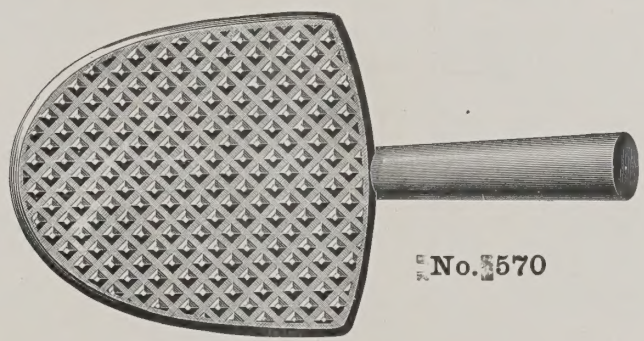
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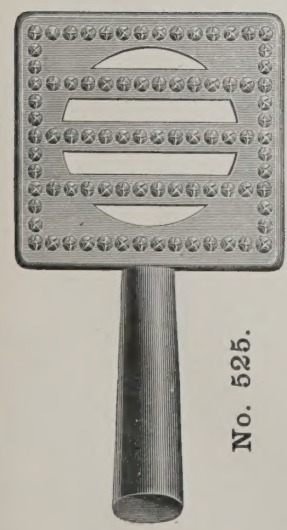
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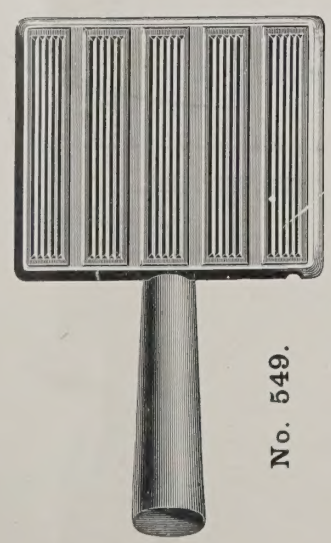
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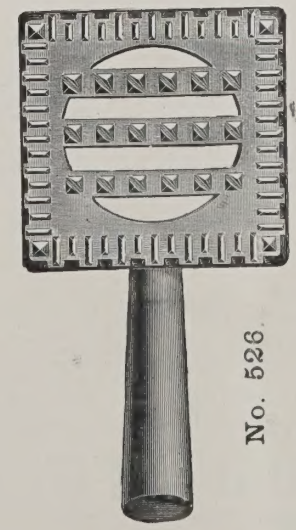
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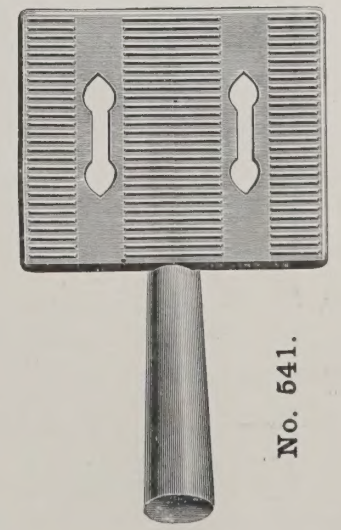
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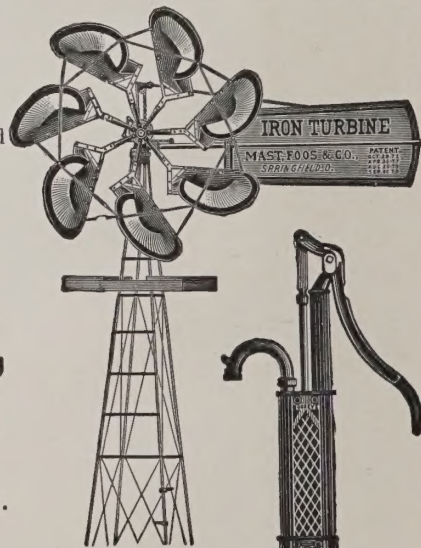
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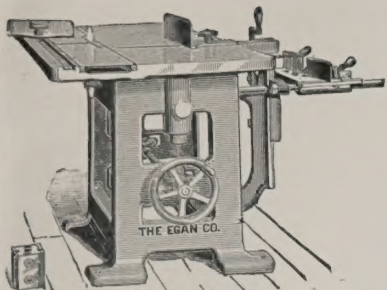
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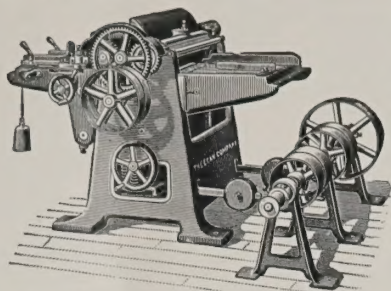
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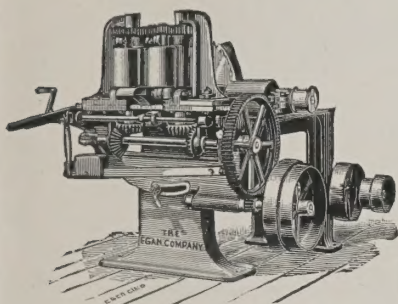
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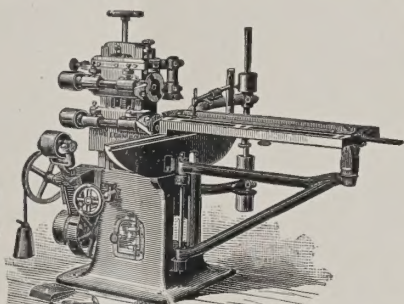
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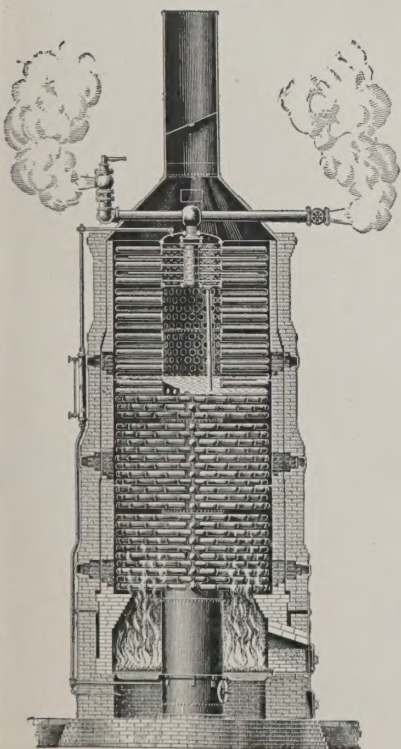


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Largest Factory  
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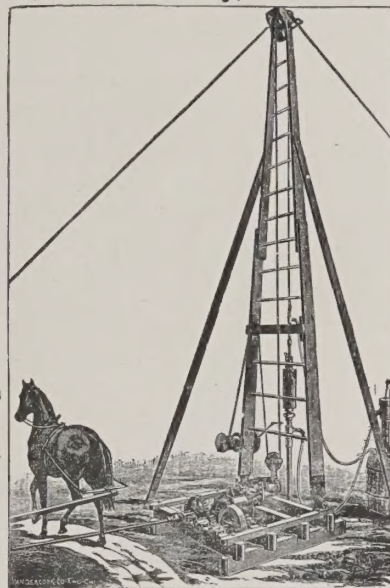
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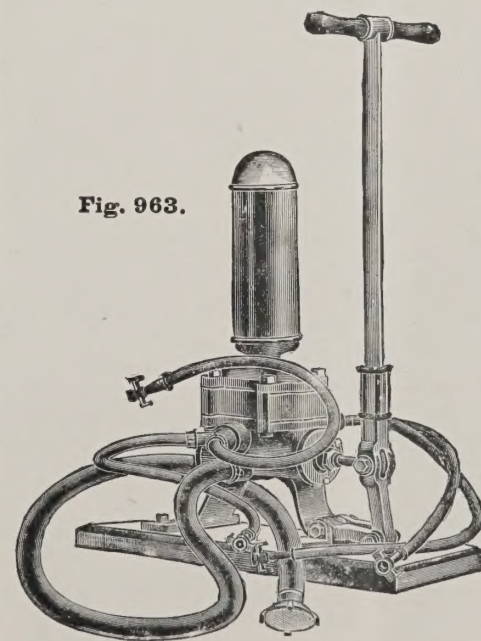
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WITH BRASS-LINED CYLINDER,  
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Fig. 963.



SIZES, PRICES, ETC.

Fig. 963. Pump Only.	DIA. CYL. 3 inches.	DOUBLE SUCTION 1 1/4	DOUBLE DIS. 1/2 or 3/4 in. hose.	PRICE. \$28.50
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OUTFIT B. FOR Four Leads.	FIG. 963. "Sentinel" Spray Pump, with 5 ft. 1 1/4 in. rubber suction hose and four leads, 25 ft. each, 1/2 in. discharge hose with "Calla" (or other) spray nozzle, Siamese connections, couplings and hose bands, complete.			\$60.50



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For polishing patent leather shoes quickly and without injury to the leather.

PRICE, - \$9.00 PER GROSS.

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Is the only Dressing in the world that does not contain Ammonia, and it positively contains oil.

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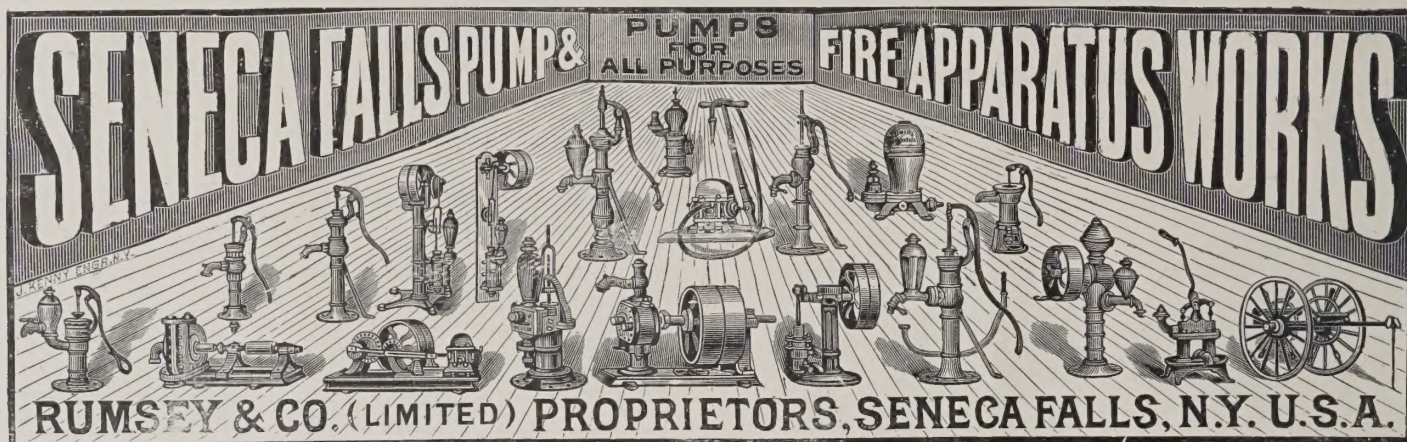
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Produces a lasting lustre.

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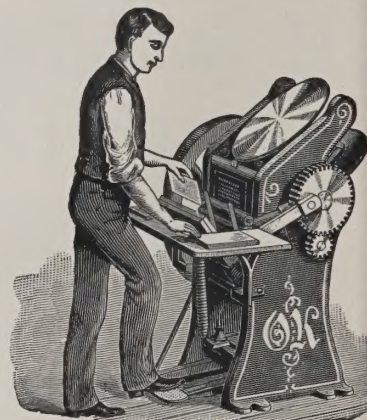
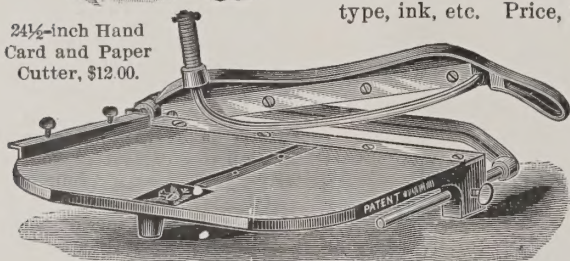
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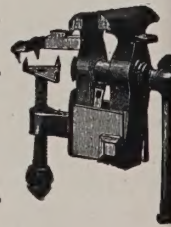
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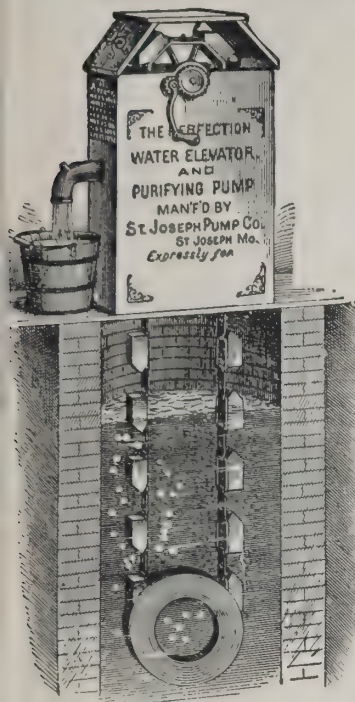
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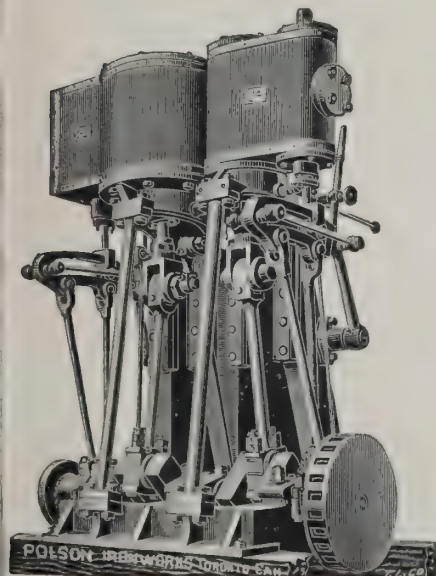
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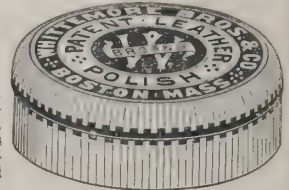
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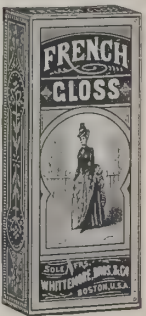
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## TO AMERICAN MANUFACTURERS.

THE AMERICAN EXPORTER was established in 1877 for the express purpose of developing a foreign demand for American manufactures, by calling the attention of the leading foreign importers and consumers to the unrivaled facilities in this country for supplying their wants.

Its policy, as then announced, has never been changed.

It is published monthly, in separate English and Spanish editions, and is dispatched direct by mail to the leading buyers of foreign goods in every country outside of the United States.

It is absolutely free and independent of any and all other existing export agencies. Its mission is to *originate trade*, and not to *execute orders*, which is properly the function of the commission merchant.

It affords equal facilities for, and does equal justice to, all its advertisers.

It does not take goods in exchange for advertising space.

It does not employ the purchasing power of commission merchants and shippers to influence patronage.

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THE JOHN C. COCHRAN CO.



### AMERICAN MANUFACTURED EXPORTS.

TWO features of American manufactured exports are causes for congratulation to the people of this country—their constantly increasing magnitude and their character.

During the first ten months of 1896 the United States exported merchandise to the value of \$206,985,482 in excess of its imports. Compare this fact with the fact that during the same period of 1895 the imports of merchandise exceed the exports by \$31,105,045, and the mighty power of this resourceful Republic to sway the currents of commerce will be clearly seen. Such an achievement, during the very period when discussion as to the merit of American securities as safe and profitable investments has been world wide, is a success of which every American can be justly proud.

More significant, however, than the volume of value of American manufactured exports is their character. Manufactured exports are the products of mechanical labor. A bird's-eye view of the workshops of the world will disclose the condition of mechanical labor in every grade of progressive development, from aboriginal ignorance bred for existence at the lowest standard of living to the most gifted, highly educated artisan, commanding the knowledge of the world and living with a degree of comfort unknown to nobility but a few years ago. Within these extremes the problem of cheap and dear labor is being worked out to its solution.

But yesterday, and even now in some parts of the world, "cheap labor" is advertised with other natural products, as cheap land, cheap wood, cheap minerals, cheap water power, to attract the location of manufacturing industries. But when the products of the highest-paid labor in the world are sold with a profit in countries where labor is paid less, down to the very lowest, it is seen that ideas regarding cheap labor require revision. That labor is certainly cheapest which turns out products at lowest labor cost. It is an undisputed fact that wage workers in the United States, considered as a whole, earn more gold dollars during a year than do the wage workers of any other country. If the products of this labor are turned out at a higher labor cost than are similar products in other countries that fact would prevent their exportation for sale in competition with commodities produced at a lower cost. It is a striking feature that the export trade in American-manufactured goods, instead of being composed of commodities upon which but little labor has been expended, it is largely composed and its greatest increase is of those commodities upon which the greatest amount of labor has been expended. Here is a brief list: Agricultural implements; bicycles; books, engravings, etc.; carriages and cars; clocks and watches; cotton cloth, colored and uncolored; manufactures of vegetable fibres; glass and glassware; gunpowder and explosives; manufactures of india rubber; electrical and scientific apparatus; builders' hardware; sewing machines and parts; typewriting machines; locomotive engines; iron and steel wire; boots and shoes; musical instruments; paper and manufactures; manufactures of wood; manufactures of wool.

It cannot be shown that these commodities are exported because of the advantages for their low cost of production found in the possession of natural resources only. If that was true the raw material would be exported and the work done upon it would be done where labor is cheaper than here. The fact that the labor is done here proves that American labor is the cheapest in the world, although the best paid. What makes it cheapest? The fact that it is most intelligent, and this intelligence is used to handle tools and operate labor-performing machinery of the highest grade of utility and efficiency, and the actual cost is the joint labor cost of the man, his tools and his machine. This is the combination that is mastering the industries of the world.

The list given not only advertises what Americans can sell to any country in the world; if correctly read it advises manufacturers throughout the world where they can find the best tools and the best machines for the purpose of producing similar commodities or for manufacturing merchantable commodities out of raw materials not native to American soil. The evidence is multiplying that those undertaking new industrial enterprises are learning this lesson.

### MECHANICAL VS. MUSCULAR POWER.

THE displacement of animal or muscular power by mechanical power during the last decade has been so rapid and widespread it has ceased to cause comment by the ordinary observer. In all the annals of history there is no record of as remarkable an industrial transformation as that exhibited by passing of the street-car horse or mule before the conquering cable and electric trolley.

People have become so accustomed to seeing the trolley car traversing the streets of cities it never occurs to them to take note of the short time since electric trolley cars were unknown.

There is another feature of this daily exhibition of the electrical transmission of power that seemingly is passing unnoticed. Who reflects when he sees the incandescent electric lamps in the cars light up that he is witnessing not only an exhibition of the transmission, but also of the subdivision, of power that gives promise of possibilities of incalculable value in industrial and social progress? No argument is required to show that a power that can be transmitted over wires from one end of the road to the other, that can be taken off the wires at any point by the moving trolley in sufficient force to operate the cars, and then be subdivided so as to give an incandescent electric lamp only the small amount of energy required for its illumination, can be so used for any mechanical purpose. Power can be taken from feeder wires and conducted into every building on either side of the road from one end of the line to the other. It can be delivered in large or small units for the operation of any power-driven machine, large or small. It can be made to rock the cradle or operate the family sewing machine for the housewife, or to operate woodworking, metalworking or any other machinery for the mechanic. Every room in every house in all these miles of streets may become a machine shop of some kind and all human exertion be limited to the overseeing, directing brain. The joint product of brain and machine labor may easily reach ten, twenty, yes, fifty times that of one man power only. This excess of production combined with the decreasing cost of mechanical power is the secret of low labor cost of production combined with a high wage rate. The contract price for one horse power delivered to the Buffalo City Street Railway Company at its power house, twenty-seven miles from the generating station, is but \$36 per year for 365 days of twenty-four hours. If this charge is made for a year of 300 days of ten hours each it will be but 12 cents per day for one horse power, or only 1 1-2 cents per day for one man power. The working strength of a horse or a man cannot be sustained at this rate of expenditure. Such a transmission and subdivision of power make every acre of land, every town lot in the United States, a possible mill site. Who is bold enough to measure the industrial results of such a development? What is possible in America in this respect is possible anywhere, provided those who undertake the task have sufficient intelligence, skill, genius. In these respects America has an undoubted advantage. In countries where wages are on the lowest level a low standard of living is necessary. A low standard of living and a high standard of intelligence are incompatible. In the world-wide competition of ignorance with intelligence ignorance is doomed. American intelligence, skill and genius will dominate the industries and commerce of the world.

### THE TELEPHOT.

WELL may one ask, What is that? It is a device invented by Dr. Robert D. Unger, of Chicago, Illinois, U. S. A., by means of which it is promised that pictures can be sent over a wire and faithfully reproduced by the receiving instrument, distance not considered. The possibilities of this new device are far-reaching.

According to the promise of the inventor dispatches will be transmitted in the sender's own handwriting, and printed matter, photographs, lithographs, etchings and oil paintings will be made to appear as photographs by the receiving instrument. Here is another American electrical wonder for the people of the world to utilize. We feel like saying to the world, If anything in the electrical line is wanted come to America and get it.



## INDUSTRY, COMMERCE, WAR.

ONE year ago THE AMERICAN EXPORTER repeated its advocacy of arbitration to supersede war as a means of settling international difficulties. All the interests it is our business to promote are vocations of peace. We then laid down the broad, fundamental, moral and economic principle that those engaged in industries and commerce, in all countries, have a natural right to peace, and that no nation, however powerful, should be permitted to disturb the peace of the great family of nations under any pretense whatever.

The cause of industry and commerce is the cause of civilization, of humanity. This cause is served best by removing differences between nations that may lead to war, rather than negotiating advantageous terms of peace after a war has placed one nation or the other at the mercy of the victor. One year ago such a cause existed between Great Britain and Venezuela. The business world well remembers the startling effect of President Cleveland's message to the Congress of the United States portraying the danger he saw lurking in that question to the peace of this Republic and the welfare of civilization, and the magnificent support given to the position he took by the authorization of the commission he recommended without a dissenting vote in either branch of Congress. We said at the time that that message would give President Cleveland more enduring and honorable fame than any other act of historic administrations. A year of negotiation has passed, and at its close comes the glad announcement that not only has a treaty of arbitration been agreed upon between Great Britain and the United States in behalf of Venezuela for the settlement of the whole boundary dispute, which Venezuela has accepted, but that a general treaty of arbitration has been negotiated between the United States and Great Britain that bids fair to render war between these two nations impossible. No greater service than this has ever been rendered industry and commerce, civilization and humanity by any administration or government since the day of civilized government began. Some outcry there was about the unsettling of business conditions by the firm position that President Cleveland took, demanding that this cause of possible war be removed. Let those who were so affected reflect what the disturbance of actual war would have been, what the stability given to industrial and commercial conditions throughout the world now is, guaranteed by the assurance of an enduring peace.

Some military men in European countries that are suffering from the hydrophobia of militarism delight in calling the United States a nation of shopkeepers. It is better so than that they should call us a nation of butchers, thus lowering us to their own level. These military grandees show but small gratitude to the hands that feed them when they treat with contempt those on whose industry and commerce they live. Every treaty of amity and commerce is an alliance between those following the vocations of peace for the perpetuation of peace. They are the real upbuilders and defenders of civilization. Gradually, as they acquire the science and art of using their power effectually, they will make the armies of industry more honorable than the armies of slaughter, the navies of commerce more glorious than the navies of destruction. The example of the American Republic, whose broad domain may be travelled over from the Atlantic to the Pacific, from the Great Lakes to the Gulf of Mexico, without seeing a single soldier, is the most potent force in the civilization of the closing days of the nineteenth century. It covers the world with the benediction of its greatest soldier, U. S. Grant: "*Let us have peace.*"

## SPAIN, CUBA, THE UNITED STATES.

THE one subject to be discussed by President Cleveland in his annual message to the Congress of the United States concerning which a world-wide interest was felt was the question of the relations between Spain, Cuba and the United States. The assurance that a settlement had been reached covering the Venezuelan question in all its aspects given out before the message was com-

pleted discounted interest in that subject, but what the President would say on the Cuban question was well guarded until his message was officially promulgated on the assembling of the Congress, December 7, 1896. The official utterances of the President in that document on the Cuban question are given in the following summary:

"The insurrection in Cuba still continues. It is difficult to perceive that any progress has been made toward the pacification of the island or that the situation as depicted in my last annual message has improved. If Spain has not yet re-established her authority, neither have the insurgents made good their title to be regarded as an independent State. Spain maintains a civil government, more or less imperfectly, in the large towns and their immediate surroundings. With this exception the entire country is either given over to anarchy or is subject to the military occupation of one or the other party. There is hardly a limit to the time during which hostilities may be prolonged. Both parties are acting upon the theory that the exigencies of the contest require the wholesale annihilation of property, that it may not prove of use to the enemy. The sure result would seem to be that the industrial value of the island is fast diminishing, and that unless there is a speedy and radical change in existing conditions it will soon disappear altogether.

## THE UNITED STATES' INTEREST IN THE WAR.

"The spectacle of the utter ruin of an adjoining country would engage the serious attention of the Government and people of the United States in any circumstances. In point of fact, they have a concern with it which is by no means wholly of a sentimental or philanthropic character. It lies so near us as to be hardly separated from our territory. Our actual pecuniary interest in it is second only to that of the people and Government of Spain. It is reasonable to estimate that at least from \$30,000,000 to \$50,000,000 of American capital are invested in plantations and in railroad, mining and other enterprises on the island. Trade between the United States and Cuba in 1889 amounted to about \$64,000,000; in 1893 to about \$103,000,000. In 1894, the year before the present insurrection broke out, it amounted to nearly \$96,000,000. Besides this large pecuniary stake in the fortunes of Cuba the United States finds itself inextricably involved in other ways, both vexatious and costly. The insurgents are undoubtedly encouraged and supported by the widespread sympathy the people of this country always and instinctively feel for every struggle for better or freer government, and which in the case of the more adventurous and restless leads in many instances to active and personal participation in the contests.

## INTERVENTION.

"The inevitable entanglements of the United States with the rebellion in Cuba, the large American property interests affected, and considerations of philanthropy and humanity in general, have led to a vehement demand in various quarters for some sort of intervention on the part of the United States. It is urged that, all other methods failing, the existing internecine strife in Cuba should be terminated by our intervention, even at the cost of a war between the United States and Spain.

"The United States has, nevertheless, a character to maintain as a nation, which plainly dictates that right and not might should be the rule of its conduct. Further, though the United States is not a nation to which peace is a necessity, it is, in truth, the most pacific of powers, and desires nothing so much as to live in amity with all the world. Its own ample and diversified domains satisfy all possible longings for territory, preclude all dreams of conquest and prevent any casting of covetous eyes upon neighboring regions, however attractive. That our conduct toward Spain and her dominions has constituted no exception to this national disposition is made manifest by the course of our Government, not only thus far during the present insurrection, but during the ten years that followed the rising of Yara in 1868. No other great power, it may be safely said, under circumstances of similar perplexity, would have manifested the same restraint and the same patient endurance, and yet neither the Government nor the people of the United States have



shut their eyes to the course of events in Cuba or have failed to realize the existence of conceded grievances which have led to the present revolt from the authority of Spain—grievances recognized by the Queen Regent and by the Cortes, voiced by the most patriotic and enlightened of Spanish statesmen, without regard to party.

#### WHAT SPAIN SHOULD DO.

"It would seem that if Spain should offer Cuba genuine autonomy there should be no just reason why the pacification of the island might not be effected on that basis. Realizing that suspicions and precautions on the part of the weaker of two combatants are always natural, and not always unjustifiable, it was intimated by this Government to the Government of Spain some months ago that if a satisfactory measure of home rule were tendered to the Cuban insurrectionists and would be accepted by them upon a guarantee of its execution the United States would endeavor to find a way not objectionable to Spain of furnishing such guarantee. It is fervently hoped that earnest efforts for the healing of the breach between Spain and the insurgent Cubans upon the lines above indicated may be at once inaugurated and pushed to an immediate and successful issue. The friendly offices of the United States, either in the manner outlined or in any other way consistent with our Constitution and laws, will always be at the disposal of either party.

"Whatever circumstances may arise our policy and our interests would constrain us to object to the acquisition of the island or an interference with its control by any other power.

#### A HIGHER OBLIGATION MAY COME.

"When the inability of Spain to deal successfully with the insurrection has become manifest and it is demonstrated that her sovereignty is extinct in Cuba for all purposes of rightful existence, and when a hopeless struggle for its re-establishment has degenerated into a strife which means nothing more than the useless sacrifice of human life and the utter destruction of the very subject matter of the conflict, a situation will be presented in which our obligations to the sovereignty of Spain will be superseded by higher obligations which we can hardly hesitate to recognize and discharge. Until we face the contingencies suggested, or the situation is by other incidents imperatively changed, we should continue in the line of conduct heretofore pursued, thus in all circumstances exhibiting our obedience to the requirements of public law and our regard for the duty enjoined upon us by the position we occupy in the family of nations. But I have deemed it not amiss to remind the Congress that a time may arrive when a correct policy and care for our interests, as well as a regard for the interests of other nations and their citizens, joined by considerations of humanity and a desire to see a rich and fertile country, intimately related to us, saved from complete devastation, will constrain our Government to such action as will subserve the interests thus involved and at the same time promise to Cuba and its inhabitants an opportunity to enjoy the blessings of peace."

### IT IS HERE—LONG-DISTANCE POWER TRANSMISSION.

FIRST came the electrical transmission of intelligence by means of the operation of an instrument that made impressions or created sounds; that was telegraphy. Its development and service throughout the world is a marvel as a matter of science and of incalculable value as an economic and social factor. Telegraphing is accomplished by the electrical transmission of power and gave the first hint of the future wonders the world was destined to witness.

Next came the electrical transmission of the means of producing light and heat. The progress of this science and art is of such recent development no extended description of it is necessary. This phase of electrical development is also a marvel of science and is an economic and social factor of high value. The area over which electrical energy may be profitably transmitted for the production of light and heat has been gradually broadened from a few hundred feet into many miles. What the ultimate may be no one

attempts to tell. The electric-lighting industry is now based on the long-distance transmission of power.

Simultaneous with the development of electric lighting came the electrical transmission of sound, enabling persons far removed from each other to speak as though face to face. As the science of telephony progressed the art of telephoning spread out the service wires until this industry far overreached the bounds originally set for it, and from being merely a local convenience for a few neighbors it has grown to hold within its circuits the cities and towns of a continent. This is another phase of electrical development that is an economic and social factor of high value.

Almost simultaneously with the electrical transmission of the means of producing light, heat, impressions mechanically made on paper, sounds, the voice came the electrical transmission of the means of producing mechanical power. This phase of electrical science and art has now passed its day of small beginnings and has boldly grasped undertakings of the highest magnitude and untold importance.

For several years the undertaking to utilize the power of Niagara Falls to generate electric power for long-distance transmission has attracted the attention of the scientific and industrial world. Details of progress have been considered of sufficient importance to be made the subject of special telegraph dispatches. On November 16, 1896, the first long-distance transmission of power for practical use in doing large work was made from the generator station at Niagara Falls to the power house of the Buffalo City Railway Company, at Buffalo, N. Y., U. S. A., a distance of twenty-seven miles. An event of this kind is of sufficient significance to merit celebrating. The Buffalo *Enquirer* of that date says:

"The cannon boomed and the people who heard it knew that the power had arrived. When the power has been in use for a few weeks and the company is in shape to furnish electricity for a celebration Buffalo will indulge in one, and will show the country that the advantages of power are appreciated. Let the good news go forth to all parts of the world that Niagara power has come to Buffalo.

"The news has gone forth. In England and Germany, in France and Russia, in Asia and Africa the people know that the great natural water power of Niagara Falls is at work creating mechanical power that is used in operating machinery in the city of Buffalo, twenty-seven miles away. This is an historic event of deep significance to the industrial progress of mankind."

The *Enquirer*, continuing, says:

"The power is here. The transmission is a success. It will contribute to the building up of the interests of this city in a thousand ways. It will attract capital here and will help in making Buffalo a great centre of industrial and commercial activity. By and by the power will be taken to other cities. How far it will go eventually no man, not even Tesla or Edison, dares to prophesy."

In 1889, in a book under the title of "The Economic Value of Electric Light and Power" (Robert Clarke Company, Cincinnati, Ohio, U. S. A., publishers), the writer made the following prophecy:

Comparing the economic value to the industrial world of water power with steam power and of water and steam power with electric power, the economic value of water power was given as 1,000. The economic value of steam power was given as 100 times greater than that of water power, placing steam power at 100,000. The economic value of electric power was given as 1,000 times greater than that of water power and 100 times greater than that of steam power, placing electric power at 1,000,000. It was also shown what the advantages of this wonderful power would mean to the industrial development of cities and towns throughout the world. In seven short years the realization of this prophecy has commenced.

A contract to deliver 1,000 horse power for use twenty-seven miles from the generating station at an annual charge of \$36 per year per horse power gives a new value to every natural water power and possibilities of a new industrial development to every city and town in the world. Who will compete the debt of mankind to American genius and enterprise?



## FOREIGN MISSIONARY WORK FOR AMERICAN MANUFACTURERS PAYS.

WE have frequently called the attention of foreign importers and selling agents to the good policy of founding a permanent and growing business by introducing American tools, machinery and manufactures generally to the people of their respective countries, not merely as merchants handling simply what is called for, but as intelligent, aggressive agents, willing to educate the people to an understanding of the advantages of using what they have to offer. There are numberless tools, implements, utensils and much machinery in use in the United States that greatly relieve or wholly dispense with the labor in various vocations or enhance the real comfort of living, for which there is no duplicate in numerous foreign countries, while those using devices for similar purposes do not have them as well designed, as light and strong, as capable of being the most helpful servants as are the American made. Points of advantage such as are here mentioned are appreciated by all classes of people when once they are really made familiar with them. This is why importers and selling agents who do the missionary work necessary to start a demand for meritorious American manufactures thereby lay the foundation of a permanent and growing business for themselves. This fact is strikingly illustrated by the experience of an English firm who over thirty years ago commenced to build up a business in London solely in American tools. It must be remembered that thirty years ago the sending of American tools to England was thought to be a venture a good deal like sending coals to Newcastle. But all this has since been changed.

Messrs. Charles Churchill & Co., in a recent letter to the *American Machinist*, say: "Our missionary work for American machine tools, which we have been carrying on for over thirty years, is now rapidly bearing fruit. Instead of trade falling off with us it is a pleasure to report that our last year has not only exceeded, but more than doubled any previous year's business since we have been established here."

This is a remarkable showing, but there are others. Owing to missionary work well done Great Britain is the largest foreign buyer of American agricultural implements and the Argentine Republic is a close second. This American machinery is helping the English farmer to make profits where without it he would reap losses, and is enabling the farmers in Argentina to underbid American farmers in the world's markets. No argument is needed to prove to the satisfaction of any importer or sales agent in any country that if American tools, machinery and manufactures can be successfully introduced into England, the home of tool and machine manufacturing, they can be successfully sold wherever they are intelligently handled and the necessary missionary work to teach people how to use them skillfully is done.

## THE REDISCOVERED CALIFORNIA.

IN 1849 the territory on the Pacific Coast now known as the State of California was brought to the notice of the world as a new Eldorado containing the richest gold mines in the world. Human gold thirst was as acute, as insatiable then as ever, before or since. Visions of gold, more than men could carry away, attracted gold hunters to these new fields from every quarter of the world, over oceans, over mountains; through the trackless deeps and the trackless forests they came with but one purpose—to get gold. During this mad rush for that precious metal all other sources of wealth were passed unnoticed.

All men who sought gold did not find it; gradually the disappointed, then others, turned their attention to neglected resources and began the work of getting gold instead of digging it. Thus began the agricultural development of the State, which has grown to become a greater interest than mining. California grain, fruit and wines are now the means of drawing gold to the State from both Europe and Asia. Through the agricultural interest the State was newly discovered. This new discovery brought to it a population of a different character, having a different purpose from those

who rushed there in 1849 to get gold and return. The emigrants to the new agricultural State went there to found homes and build up about them the civilized life of which the American home is the heart. During these years a broader transformation had occurred. Steamships had been built that crossed the trackless oceans with an accuracy and speed never before known; railroads had been built through the trackless forests making travel by the overland route as safe, as comfortable, and, when passing over the mountains, far more entertaining than travel in countries of the older world.

This review notices the State as a new mining and an agricultural territory. Instead of exhausting its resources these industries have only warmed them into life. Emerging from the days of small beginnings a new industry is fast assuming large proportions until it has attracted world-wide attention and caused a rediscovery of California as a manufacturing State. This interest now gives promise of successfully contesting with the mining and agricultural interests for the prize of supremacy. Already manufacturing work of the first magnitude is being undertaken. At the Union Iron Works, San Francisco, there are under construction a battleship of the first class and a 30-knot torpedo boat for the United States Government and a 22-knot cruiser for Japan. This will lead to the construction of an armor-plate plant and a factory for the manufacture of large guns. With these enterprises fully developed the thrice new State of California will contain within itself every source of power and greatness that has made England the leading manufacturing and naval power of the world, and more. Its climate and natural resources are so far superior to those of England. They make California a veritable paradise in comparison. The chief interest in these contracts for naval ships is in the fact that such a manufacturing development never exists apart from a long list of manufacturing for the arts and vocations of peace equally well developed. That Japanese cruiser will not pass out of the "Golden Gate" of the Pacific for transfer to the Japanese Government without being preceded and followed by a long list of manufactured commodities made in the new State of California for export to Asia and the island continents of the Far East.

The building of navies for all the powers joined by the waves of the Pacific is but an incident in the growth of Western-Eastern maritime power. The commercial marines of the powers whose ocean commerce must use the free highways of the Pacific are destined to become of the first magnitude. Here is a field for enterprise, an opportunity to earn the gold of the world that will bring back to California more gold than has ever been taken from it and will make it one of the richest States in the American Republic.

## PROTECTION FOR MANUFACTURERS IN FOREIGN COUNTRIES.

SO long as persons who are morally defective imagine they can gain some special advantage by committing commercial frauds commercial frauds will be committed. This fact makes it necessary for all honestly disposed people to express their abhorrence of such practices by the enactment of laws for their punishment. If the results of such practices were fully and properly understood buyers would be more eager for their suppression than sellers. In all countries there is an unintelligent opinion among the misinformed and the uninformed that the granting of adequate protection to the trademarks and inventions of foreigners will in some way, not clearly specified, work an injustice to themselves. The reverse of this is true.

The more widely and perfectly a manufacturer is protected in his trademark, designs and inventions the greater is his inducement to have everything bearing his impress superior in every point of excellence. Under such conditions in the course of time the prestige gained by his work becomes of the highest value to both himself and his customer. It assures the manufacturer will receive all orders regardless of the country from which they emanate, as his trademark will be the sign by which the buyer will be assured that he has secured the tool or machine he wanted and not some imitation



that looks like it. If the manufacturer is fully protected so is the buyer.

A manufacturer, making a specialty of a few lines of goods as he does, naturally knows more about the possibilities of his tools or machines than a buyer as a rule can. By protecting the manufacturer he is interested in pushing his products to the highest grade of perfection and in teaching buyers how to use them with best advantage. In many departments of machine building the machine user will obtain better results by specifying what he wishes to accomplish with the machine, the material to be used, the power available, the character of the machine operators to be employed and the style or quality of the product to be made than he will to buy a machine built for general use. In this way he can secure from the manufacturer the best guarantees of performance that can be given, as he will know what modifications from his stock design can be made to adapt it to the special purpose and how to make them.

A national policy to secure to every manufacturer the good results of good work in every particular, whether domestic or foreign, will induce every tool and machine builder to do his best, and to supply his best products broadcast throughout the world in no fear of being robbed of his just rewards by base imitations and substitutions. For such a consummation buyers and users of tools and machinery should coöperate with manufacturers to secure the needed legislation.

#### GERMANY—THE UNITED STATES.

IN THE AMERICAN EXPORTER for November, 1896, reference was made to the false pretenses put forward by the German Government in defense of its import duties and regulations adopted for the exclusion, as far as possible, of American products. In that article we said: "Having determined to do the thing, and to give a false reason for doing it, that Government will hardly be restrained from doing it by being told its reason is not true. Some means must be found that appeals not to a defective moral sense, but to a tangible and sensitive commercial interest. When such an interest is selected for punishment something like a response of repentance may be secured."

Unrelated to the subject then under consideration, but aimed at the same moral defect in German official character—false pretense—the President of the United States, under date of December 3, 1896, issued a proclamation abrogating the privilege German steamships have been enjoying for several years of entering American ports without payment of lighthouse dues. This privilege was granted on condition that a reciprocal privilege should be granted to American ships entering German ports. German steamship companies have been glad to accept the benefits of this arrangement accorded to them on this side, but official Germany has sought to evade reciprocating by permitting local authorities to collect the duties from American ships and when remonstrated with claiming that they were not at fault because the collection was made by local not national authority. German steamship companies will now pay a number of thousands of dollars each per year to American collectors as a fine for the false pretenses indulged in by official Germany in this case. Every payment will be a reminder to them of the truth of the old adage, as true for nations as for individuals, that "Honesty is the best policy."

#### AMERICAN PIG IRON.

FOR several years the production of pig iron of good quality at low cost in some of the Southern States of the United States has attracted increased interest from foreign consumers of that product. At first this iron was exported in small lots on trial orders. This has been followed by other orders for larger quantities, until the trade begins to assume the appearance of a permanent demand. Liverpool, Rotterdam and Genoa have already made a liberal use of American iron from the furnaces of Alabama and Tennessee. Now Asia appears as a buyer, a recent order being for the shipment of 1,000 tons of Alabama iron to India.

The cheapness and quality of this Southern iron is slowly but

surely revolutionizing the manufacture of the cheaper grades of pig iron in the United States. The movement in that direction will of necessity extend to all iron-producing countries. As the resources of the Southern States are practically inexhaustible iron exports may become a leading feature of Southern industry.

#### AMERICAN IRON AND TOOLS WANTED IN SWITZERLAND.

MESSRS. BAER & CO., one of the largest and most reliable wholesale iron and hardware firms in Switzerland, with houses at Zurich and Basle, recently called on Mr. Eugene Germain, United States Consul at Zurich, and asked to be put in communication with American manufacturers in their line of business, specifying articles covering the whole scope of their trade. Early in 1895 this firm asked to be put into communication with American manufacturers of iron tubes and pipes, and are now importing largely from America, a recent order being for 400 tons. The satisfaction given by this trade has led them to seek the broadest possible extension of their American imports. This is another instance where an enterprising importing firm in a country of high mechanical intelligence has recognized the fact that when American manufacturers can sell iron, tools and machinery to England they can sell to any country in the world.

#### RAILROADS IN THE UNITED STATES.

THE following statement is based on the report of the United States Interstate Commerce Commission for the year ending June 30, 1896:

Mileage operated.....	172,369
Gross earnings.....	\$1,123,646,562
From passenger service.....	323,468,391
From freight service.....	772,071,874
Operating expenses.....	754,971,515
Net operating income.....	368,675,047

#### COMPARISON WITH 1895.

Increase per mile over 1895:	
From passenger service.....	\$113
From freight service.....	349
Surplus from operations 1896.....	6,528,667
Deficit from operations 1895.....	31,075,030

THE *Journal of Commerce* says: "The attention of trunk and bag manufacturers in the East has lately been aroused by a certain kindred manufacturer as far south as Petersburg, Va., who has lately come into the export market of New York City with much success. A good authority on the subject says that the best and only reason for this competition is that Southern labor is cheaper; material can be bought for less cost, and freight, a big item, from the South to New York City is to-day lower than it has been for years. Considerable contracts for export on trunks have been placed in the factory at Petersburg, principally for Central America and British West Indies."

THE large sales of American merchandise abroad continue. Exports for October amounted to \$113,385,497, exceeding those of any previous month in the history of the country except December, 1891. The excess over imports was \$63,011,822, as against \$12,010,628 for the same period last year. For the ten months ending with October the excess was \$206,985,482, while for the corresponding months of 1895 there was an excess of imports amounting to \$31,105,045. The showing for last year was unusual, but the record of the present one is quite as remarkable in the other way. The excess of exports for the ten months ending with October, 1894, was \$96,661,369; 1893, \$13,836,660; 1892, \$20,937,826; 1891, \$46,487,800. The largest figure is less than half that for 1896.

MORE rumors come from England concerning the establishment by American capitalists of an American paper mill in the vicinity of London. It is now asserted that the mill is to manufacture coated papers, to be used in the printing of "half tone" and other similar reproductions. It is conceded by the English printers and engravers that they cannot produce such good results in work of that class as are produced in America, and it is generally understood that the advantage held by the Americans lies in the paper. But similar paper, exported to England, does not so well serve the purpose there as here, and it is presumed that it loses something of the necessary quality in the transmission to a different climate. All of which has suggested the establishment in England of an American mill. It is to be noted, however, that all the gossip concerning this enterprise comes from the other side.—*Paper Mill.*



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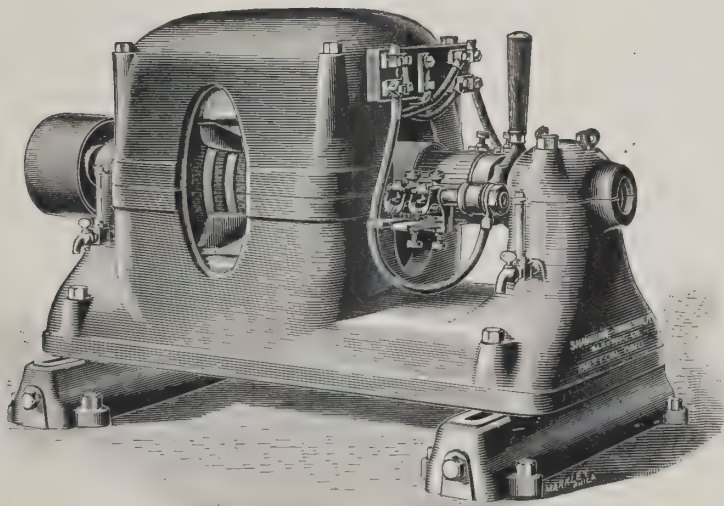
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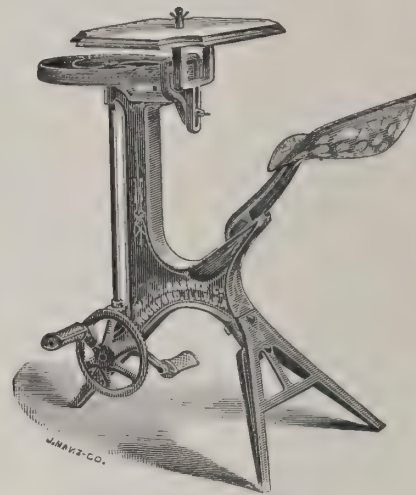
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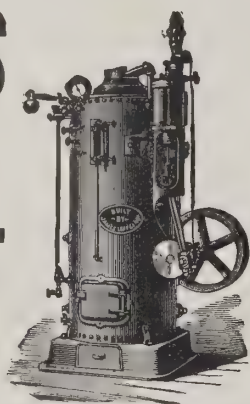
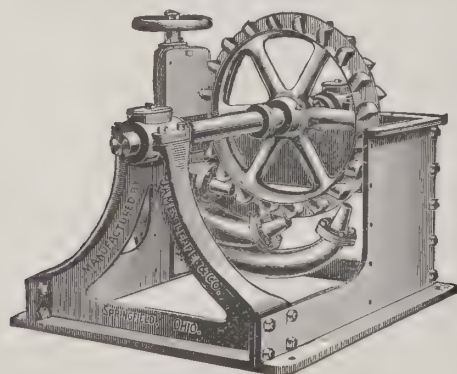
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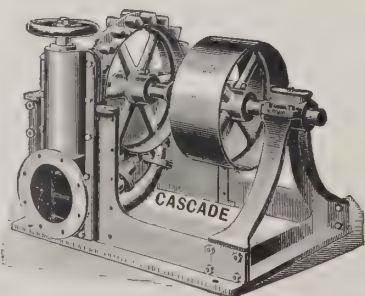
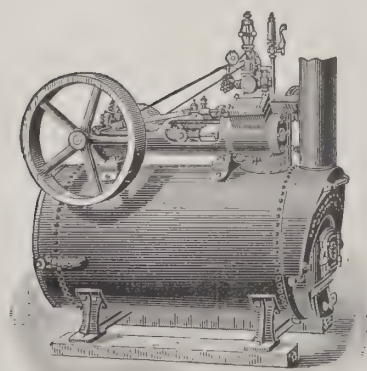
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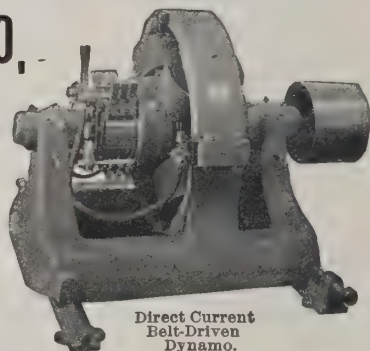
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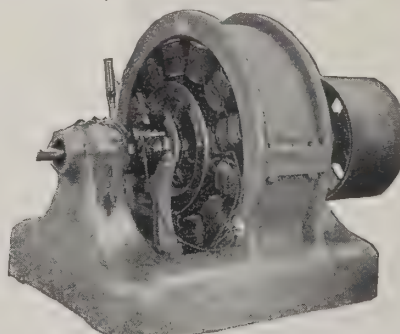


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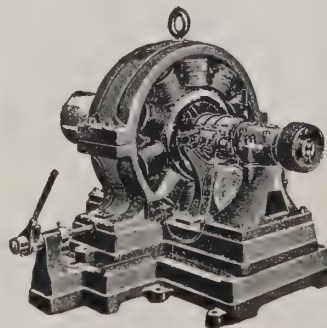
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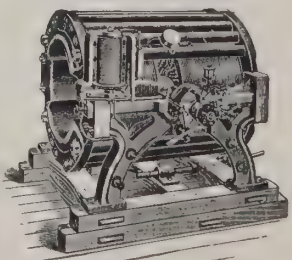
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### American Bright Plates.

IT is a matter of general cognizance that American terne plates have for some time past practically superseded the imported roofing plates in the estimation of consumers, on the score both of quality and price. American bright coke plates, too, for like reasons, now rule the home market to the virtual exclusion of the Welsh product. But the fact is not, perhaps, fully appreciated that bright charcoal tin plates of American manufacture are rapidly reaching a similar position. Almost without exception the leading manufacturers of tinware and cans are, as a matter of fact, now using American-made tin plate in their factories in the place of the foreign product, solely on account of its merits. Recent conversations with leading officials of two of the largest tin-stamping companies in the United States have elicited the fact that practically nothing but charcoal tin plates of domestic manufacture are now being used in the factories of both these concerns. The only exception to the rule is in the manufacture of some few articles whose exceptional depth calls for a special quality of Siemens stamping steel not yet produced here. In the case of both concerns it was acknowledged that they were for long somewhat skeptical as to the adaptability of American plates for their purposes, and were very slow to abandon the imported material with which long use had made them familiar. But both state that the charcoal plates they are now getting from the American works are so satisfactory in every way, and, on the whole, so much more reliable as to uniformity of quality than the imported plates they formerly used, that they have no desire to return to the foreign article. It is satisfactory to know that before long even the comparatively small proportion of Siemens plates necessary for the deepest stamping work will be made in this country.—*Iron Age.*

### New Hoop-Fastening Machine.

A NEW and novel hoop-fastening machine has just been placed in operation at the plant of the Minneapolis Cooperage Co. The machine is one on which the manager has been working for several months, and he seems to have evolved an invention which will give the barrels turned out by his shops a distinctive feature. It is, of course, for nailing or fastening patent hoops, and does away entirely with the use of ordinary nails or staples. The machine stands about three feet high and, while the internal mechanism is pretty well inclosed from sight, it is understood to be quite complicated, though not to such an extent that it will easily get out of order. Hand or steam power can be employed in operating it, and a boy can serve as attendant to feed on the hoops. The wire from which the fastenings are made is fed to the machine from a coil. At the front of the device is a hoop form, over which the hoop to be fastened is placed. When a lever is pressed downward by the foot this form projects outward until the desired circumference of the hoop is reached, when some parts of the machine are set in motion that not only cut and bend the wire into proper shape, but carry it around the outside of the hoop and the ends back to the under surface, where they are run through the hoop and fastened between the laps. Thus no jagged ends are in sight at all, either when the hoop is off or when it is on the barrel. Hoops can thus be fastened, two fastenings to the hoop, at the rate of about thirty per minute. After the hoop is on the barrel all that can be seen of the fastening is a single wire, wound tightly around the laps of wood. Foreman Colby has experimented with different fastenings, and says this one is so secure that a hoop will break at almost any other place rather than where the wire engages it.—*Northwestern Miller.*

### Chicago Laundry Machinery.

THE *National Laundry Journal* reports on the export trade of laundry machinery from Chicago during the last two months as follows: "One whole plant to Johannesburg, South Africa; one to Arnhem, Holland; one to St. Petersburg, Russia, the first steam laundry to be set up in that country; an order for a laundry plant to Tokio, Japan, and a probable one for Honolulu, besides a large amount of machinery for England, Ireland, Scotland and Switzerland. Of this latter, there is always a brisk export trade going on, but the extent to which Chicago supplies the rest of the world with laundry machinery has hardly been realized by the general public, and it may be remarked incidentally that the steam laundry industry is as yet only in its infancy in most of the so-called civilized countries of the world."

### American Mining Machinery in Spain.

THE San Francisco *Chronicle* of November 14th says that Mr. W. C. Hunton, of that city, has returned from Spain. In March last he went to Nava de Jadaraque, in Guadalajara, under engagement by the Navason Gold Mine Company, to erect and put in operation a Huntington mill and Frue concentrators, and found engaged about four miles away Charles Abbott of this coast also erecting a three-stamp mill. The selection of American machinery by foreign corporations is a compliment to American mechanical superiority, while the selection of Hunton and Abbott to put things in shape is proof of the ramifications of Leidesdorff street, which, not content to invade the Transvaal and Western Australia, has its representatives in the Iberian Peninsula, rehabilitating mines that were worked by the Romans and by the Arabic successors of Spain's Gothic conquerors.

Speaking of his trip yesterday, Mr. Hunton said its principal object was to make tests of several thousand acres of alluvial lands in order to establish a large plant. These inquiries proved satisfactory. In spite of the many peoples and the many centuries these ledges were found never to have been well worked. In sinking shafts, said the Californian, tunnels run by the Romans were found. Generally they had been filled up, but in some instances they were intact in the solid rock. Roman mining in Spain was generally done by tunnelling or by shallow shafting, and their penetration of the rock was marvellous.

Mr. Hunton has a poor idea of the Spaniards as miners. In the first place, he says, they are deficient in mechanical knowledge, and that their holidays are so numerous as to continually interrupt their labor. During the five months he was in Guadalajara they had twenty-two fiestas in addition to Sundays, days on which they absolutely ceased work. Mr. Hunton, who has been in Mexico and China, says that Spain is half a century behind the former country in methods of work, while the food of the common people is the worst he has ever eaten. They are vigorous and industrious, however, and the educated people are peculiarly agreeable in their manners.

### American Car Wheels in Hungary.

IN connection with the report that 2,000 tons of American iron had recently been ordered to Budapest it is known that an American firm of car wheel-makers recently established a manufactory upon a large scale in Budapest, of the peculiarly American industry of "chilled" cast iron car wheels. The Philadelphia *Record* is informed by Mr. A. E. Outerbridge that "the special kind of iron used in this work is practically unknown in Europe, and stringent laws exist in all, or nearly all, of those countries making it a penal offense to use cast-iron car wheels on the railways even for freight service. The enterprising American firm referred to submitted American cast-iron car wheels to the standard and rigid tests adopted by the Austrian Government for the steel and wrought iron wheels used in that country and succeeded in convincing the Governmental authorities of Austria-Hungary that these wheels were thoroughly reliable and very much cheaper than the Austrian wheels, with the result that a foundry employing several hundred men is now in operation at Budapest, conducted by Americans. This is the entering wedge in a new business abroad, which is destined to grow to large proportions as soon as the foreign prejudice against chilled cast-iron car wheels shall have been overcome by a practical demonstration."

### May Buy American Steel Works.

THE magnitude of the Pittsburg steel industries has astounded the five Japanese Commissioners who are now making a tour of the United States inspecting steel works for the purpose of obtaining such information as will enable them to determine what kind of steel plant will be best adapted to the requirements of Japan. They are on a tour of inspection of the great steel works of America and Europe, having in contemplation the buying of a plant costing, approximately, \$2,000,000. They say they will buy where they can get the best and cheapest. The plant when finished is to have a capacity of 100,000 tons. It will be built in the coal fields in Southern Japan. Both Martin and Bessemer steels are to be manufactured. "We want to put our country," said Mr. Oshima, "where it properly belongs—in the van as a manufacturing nation. We will need a vast amount of steel and do not want to depend on any other country for it."



### Novel Fire Engine.

A FIRM of cyclemakers at Racine, Wis., says the *New York Herald*, is preparing to equip in every detail a first-class fire department on pneumatic wheels. These wheels are not simply for the firemen to ride when they like, but fire apparatus itself is attached to them, and when the alarm sounds the firemen, instead of being drawn to the scene of flame and smoke by plunging horses, will "scorch" both themselves and their apparatus to the point of destination.

The most notable feature of the apparatus, and by far the most elaborate, is the cycle chemical engine. It is built on the tandem pattern, although there are accommodations for three wheelmen. The engine is exactly similar to that in use by many of the fire departments of the country. It is equipped with the regulation lanterns, fire axes, crowbars, pike poles, etc. The engine carries also the regular chemical fluid.

The attention of veteran firemen the country over has been turned to the cycle fire apparatus, and the consensus of opinion seems to be that no adequate reason can be advanced to prove that it is not practical.

The hose cart, with its clanging bell, when equipped with the bicycle attachment becomes again the hose reel. It is propelled by three riders in much the same manner as the chemical engine. Being much lighter, however, the pace is far greater, and it is likely to beat the engine to a fire by about half time. There never was a team of fire horses, fast as they go, that could get an apparatus to a fire in as short a space of time as it can be moved there when it derives motive power from the cycle—so, at least, it is claimed. There is small danger of accident, except to the leader, or pilot, and he can scorch to his heart's content without danger of molestation by persons in bluecoats and brass buttons.

### Growing Use of Gas and Oil Engines.

GAS and oil engines find a constantly widening field of usefulness. Among the latest applications are those to mine hoisting and mine haulage, and for both services designs have been put on the market which will probably help a good deal toward still further popularizing engines of this class. For hoisting work particularly, and especially in the case of small mines where the hand windlass or the horse-power machine will no longer give satisfaction, the gas or oil motor offers a number of advantages worth considering, among them the stereotyped, but none the less important, one of fuel convenience. The water supply question, also, is easily disposed of, since the same water—and a small quantity, too—can be satisfactorily used over and over again to cool the engine, while its quality needs no consideration so long as it will not badly corrode the iron. With the scarcity of even fairly good water that is experienced in many mine localities, this feature of the gas or oil engine outfit will be especially appreciated.

### Superiority of American Ships.

THE superiority of workmanship on boats built in America over those put up in Great Britain for the same classes of tonnage is a matter of such general knowledge that it is no longer contested by those who have no reason to be biased. A few years ago a lake building firm offered to build a ship for the West Indian trade for \$250,000. The contract was secured by an English yard for \$150,000, or just 40 per cent. of the price asked on the Lakes. The ship made a few trips, but had not been in commission very long until she failed to return from one of her voyages, and was never heard of again, although there had been no exceptionally bad weather and no reason for the loss of a staunch steel ship, unless by collision, a form of disaster which usually leaves some traces. The difference in price between the American and English yards would not now be so great on a ship of this size, as the introduction of labor-saving machinery and the reduced prices of material, which is now as cheap in America as in England, have given lake builders some advantages which they did not enjoy a few years ago.—*Marine Record*.

### Metallic Lathing.

MODERN building methods and materials seem to be undergoing a very complete change, even to the smallest details. The familiar wooden laths are now being rapidly driven out of use. Metallic lathing makes the walls stronger and the plastering less liable to crack. The first metal lath was a thin strip of sheet metal with the edges turned to give it stiffness. Then they were rolled with ribs as well as the turned edges. Perforated sheet iron with ragged punctures that would hold the mortar came later, and then wire netting lathing was introduced. The wire netting, strengthened with ribs of coarser wire, is used for partitions and also for concrete floors. The industry has led to scores of patents, most of which are for various styles of perforating, twisting, expanding or variously distorting or extending the original flat surfaces. The sales of one company manufacturing this material are said to run considerably above a million dollars a year.—*American Machinist*.

THE Baldwin Locomotive Works have just filled an order for a 2-foot gauge mountain climber for a Mexican railroad, a compound engine for the Norwegian State Railroad, and an armored locomotive, which is almost a fortress, for the use of the Spanish troops in Cuba. The cab is protected by steel plates  $\frac{3}{8}$ ths of an inch in thickness, which can be slid over the glass when required. These shutters are provided with loopholes, through which defense can be made with the rifles of the guards or the machine gun which is mounted on the cab.

### Building Machinery for Russia.

THE Shaw Electric Crane Company, of Muskegon, Mich., has just completed four large cranes for the Mariopol-Nicopol Mining and Metallurgical Company, of Russia, and will ship them as soon as the directions are received. The contract called for their completion November 11th, and they were ready on that date, but the heavy demand for shipping facilities has made it difficult to get a vessel to transport the machinery across the ocean, and the shipping orders have accordingly been delayed. One of the four cranes is a 50-ton ladle crane for a steel-making plant, two of the others are 10-ton and the fourth a 15-ton travelling crane for the machine shops. The cranes have been set up and thoroughly tested in the shops here, and when the shipping directions are received will be taken apart and boxed. They will make seven or eight carloads of freight. These four cranes are but a small part of the equipments being supplied from this country for an immense manufacturing plant being established by European and American capital near the city of Mariopol, in the province of Ekaterinoslav, Russia. Much of the material for the buildings and practically all the machinery will be sent from this country, the plan being to charter a vessel to take it over. The boat will be loaded at New York or Philadelphia, and the route will be by the way of Gibraltar, up the Mediterranean, through the Dardanelles, across the Black Sea and up the Sea of Azov to Mariopol.

### Ingenuous Spinning Machine.

IT is claimed that the Fall River (Mass.) Machine Company has accomplished that which inventors in the line of spinning machinery have long sought, says the *Industrial World*, namely, the construction of a ring-spinning machine which dispenses altogether with the intermediate machinery in the carding department of a cotton mill, and this, too, without any drawbacks as to the quantity and quality of yarns spun or cloth woven. In this mechanism the condenser rests between the two front rolls, which concentrate and guide the loose fibres of the roving to the bite of the front roller, and the yarns of any number, so far up as forties, by the new system are found to be lofty, compact and substantial from top to bottom of the bobbin, so much so that the practical spinner cannot determine the mule yarns spun from those spun by this spinning frame. One yard of the new frame yarn stretched to  $2\frac{1}{2}$  inches, and No. 13's, when tested, show a breaking strength equal to other machines.

### American Skilled Labor.

FRENCH engineers engaged on the Panama Canal enterprise have adopted, according to a press report, the system of excavation by means of cable transfer, as used in the construction of the Chicago drainage canal. This recognition of the superior merits of an American apparatus is not without its significance. It is one of the many examples of foreign appreciation of American devised and constructed machinery; that bodes well for the growth of our trade in this line in foreign markets. In the present instance the skill required to work the machinery at Panama is not easily obtainable. Intelligent labor is one of the necessities of improved machinery, and it is not stretching a point to say that the reputation of American workmen will in many cases make them as valuable and economical as the use of American machinery. Where skilled labor is not foolishly prohibited from employment in other countries the American artisan has a future hitherto unsuspected in the labor market of the world.

AS AN object lesson to English manufacturers whose goods have been displaced in the colonial markets by those of the manufacturers of other nations, the British Colonial Secretary, Mr. Chamberlain, has established an exhibition in London consisting of samples of the goods of foreign make that have thus beaten the English which he has been gathering through colonial agents during the year. Among the goods already gathered and on exhibition are American spades, axes, hatchets, saws, chisels, planes, scissors, locks, nails, etc. An English exchange, commenting on this exhibition and the lessons that may be learned therefrom, speaks quite highly of the neatness, finish and quality of these goods, considering their cheapness, and particularly praises the neatness of American packing as compared with the English.—*Implement News*.

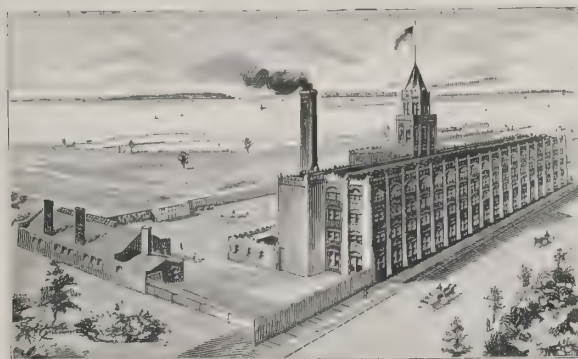
JAS. P. McDONALD & CO. have lately completed a contract for the construction of a railroad on the Island of Jamaica, West Indies. The total length of the road is 185 miles. The Port Antonio extension across the mountains will be 46 miles long. The road is owned by the West India Improvement Company. The New York Equipment Company will have the buying of all the rolling stock, equipments, etc., and according to Mr. Irving, president of the company, the following contracts have already been awarded: Locomotives, to Rogers Locomotive Works; passenger cars, to Jackson & Sharp; freight cars, to Ramapo Iron Works; bridges and trestles, of which there will be required 193 in all, to the Pencoyd Iron Works.

THE question has been asked, "What are the English toolmakers about that they have allowed the Americans to get so far into European markets as to have supplied most of the equipment for the National Small Arms Factory at Herstal, near Liege?" This factory, which was founded in 1890, and is one of the most perfectly equipped of its kind in Europe, has been largely fitted with American tools. Thirty per cent. of the equipment is stated to have been furnished by Messrs. Pratt & Whitney, of Hartford, Conn., while additions made during the past year to the value of \$140,000 have been supplied by the same firm and by Messrs. Brown & Sharp, another American house.



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TIME TRIES ALL—METERS AS WELL AS OTHER THINGS.

The Meters made by this Company for all kinds of service have stood this test for many years and have proved their superiority over all others. Over **172,000** in use. The largest and most complete line of Water Meters in the World.

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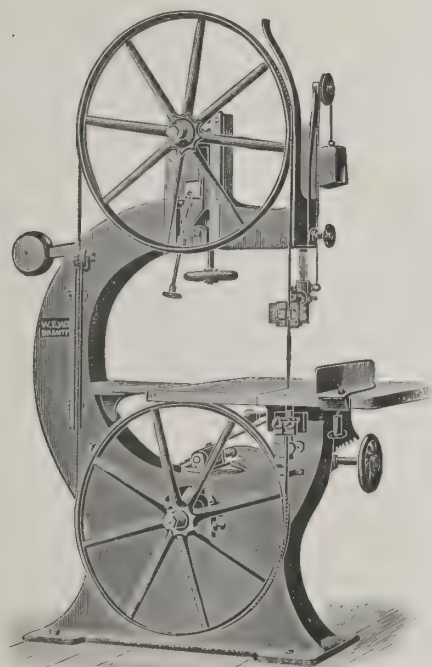
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[DECEMBER, 1896.]

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No. 3.—36-inch Wheel. Weight, 2,000 lbs.

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No. 5 Band Resaw.—48-inch wheels; saws 24 inches wide, 5 to 40 feet per minute. Resaw swings clear of machine when required. Weight, 4,500 lbs.

No. 6 Band Resaw.—48-inch wheels; takes saws to 3 inches; cuts 30 inches deep. Weight, 4,300 lbs.

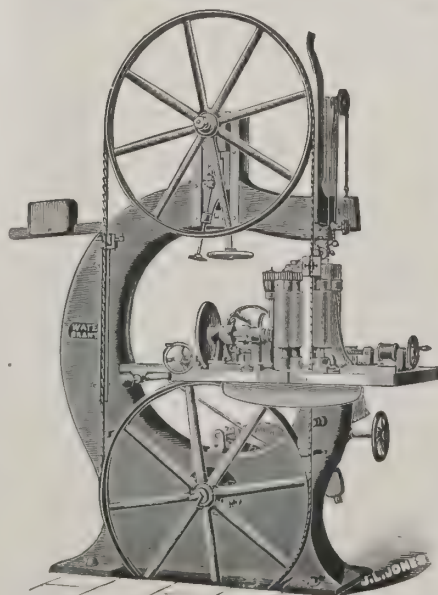
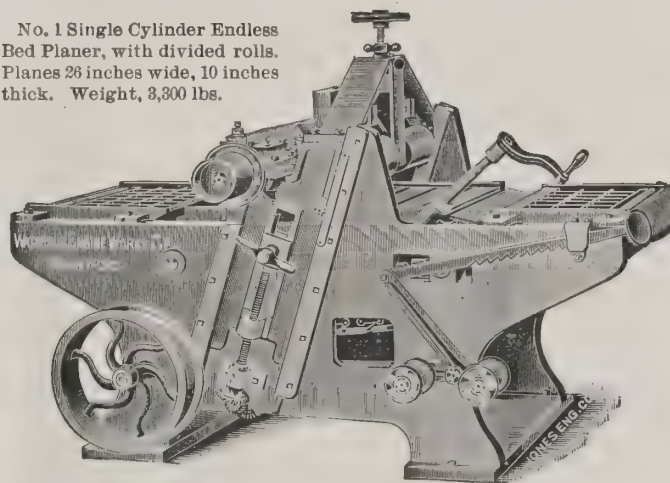
No. 7 Band Resaw.—54-inch wheels; 4-inch saws; cuts 30 inches deep and to center of 10 inches. Weight, 5,300 lbs.

OTHER SIZES MANUFACTURED.

FULL LINE OF

Saw Mill Machinery.

No. 1 Single Cylinder Endless Bed Planer, with divided rolls. Planes 26 inches wide, 10 inches thick. Weight, 3,300 lbs.



No. 4.—40-inch Wheels and Removable Resaw. Weight 2,750 lbs.

## Wood-Working MACHINERY.

No. 1 E. B. Planer. Weight, 3,300 lbs.; like cut.  
No. 1 Double Cylinder E. B. Planer. Weight, 5,300 lbs.  
No. 2 E. B. Planer. Weight, 2,600 lbs.  
"Champion" Combined Planer, Matcher and Moulder.  
Planes 24 inches wide up to 6 inches thick. Best all-around machine.

MANY OTHER STYLES AND SIZES,  
AND FULL LINE OF  
WOOD-WORKING MACHINES.

Long experience in the export trade is  
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January, 1896, we moved into new premises, securing unsurpassed facilities for executing contracts promptly and satisfactorily. Order direct or through your commission house, sending us copy of order.

Saw Mill Machinery Our Specialty.

There are some 300 of our saw mills running in South and Central America, Europe, Asia and Africa, of different sizes, from those cutting logs 6 feet in diameter to small mills sufficiently portable for mule-back transport.

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CANADA.



### American Machinery for Panama Canal.

THE Hon. Victor Vifquain, United States Consul at Panama, U. S. C., has forwarded to the State Department the following report on the purchase of American machinery by the Panama Canal Company:

"As in former years, the Panama Canal Company has again come to the conclusion that American machinery is best to advance the gigantic labor they have to accomplish, and to that effect has purchased a first lot of hoisters and conveyers from the Lidgerwood Company, of Liberty street, New York, seven in number. Each cableway is a very ponderous and expensive affair, but a very great labor-saving engine; the weight of each machine, complete and ready for action, being 200 tons, and costing about \$14,000 each. They have been used with great success at the Chicago-Joliet Canal.

"A French engineer was sent to examine the machinery in use on the construction of this canal, and from all the various engines seen there he selected the Lidgerwood cableway as the best adapted. It was the intention to place 100 of them in operation, or enough to dispose of 50,000 cubic meters of earth or stone every ten hours."

### American Drills Did the Work.

IT is gratifying to our national pride to know that American machinery was employed in the recent opening of the Danube River at the famous point in its winding career known as the "Iron Gate." At this point the border lines of three countries, Roumania, Servia and Austria Hungary, converge and the point has received the name of the Iron Gate from the fact that vessels have never been able to pass it until the present. In order to deepen the river's channel at this point it has been necessary to blast the rock over which its current has rippled since the beginning of time. In boring holes in the rock for the reception of the blasting powder American drills were used on account of the superior merit which they possessed. The inventive genius of the American is recognized throughout the globe and no country surpasses America in the mechanical devices which she has produced during the present century.

A DISPATCH from St. Petersburg to the London *Times* dwells upon the great increase of American trade with Russia. "American locomotives are being imported," says the dispatch. "Americans are building locomotive works on the Volga, and are laying naphtha pipe lines in the South, while armor plates for the Russian Admiralty are being made in the United States." Japan is also finding out the superiority of American locomotives. In a recent test of English and American locomotives the Baldwin engine pulled up a grade a heavier train than the English engine could.

THE largest two-piece pulley in this country is the one of the great iron works establishment at Pittsburg. It was made in 1893, and is looked upon as a marvel in the wheel-casting line. None of the great casting works of the country would undertake the contract for making the gigantic wheel and the necessary apparatus to accompany it, so the firm desiring it (although it was out of its line of business) finally did the job itself. As it is now the wheel is 24 feet in diameter, and has a face 48 inches wide, and weighs 54,000 pounds. The whole pulley, clamps, side pieces, bolts, hooks, etc., weighs 61,000 pounds.

THE *New York Journal of Commerce* says: "The demand for American sanitary supplies in the Argentine Republic has of late increased very perceptibly. By the first direct vessel to Buenos Ayres an invoice will be shipped, consisting of 148 enamelled bathtubs, 156 closets and 190 basins. These supplies are to be used in modern buildings which are in the course of erection at that capital. A leading shipping firm says: 'The demand in all large cities throughout Argentina for American plumbers is evident. Since August last we have sent ten expert plumbers, making yearly contracts, paying them at an average \$150 per month.'"

JOSEPH U. CRAWFORD, engineer of Branch Lines of the Pennsylvania Railroad, who was recently appointed representative of the Imperial Railroads of Japan, for the purchase of 15,000 tons of steel rails and fastenings from the Carnegie Steel Company, Pittsburg, Pa., reports that shipments of the material are now being made to Yokohama. A contract with the Carnegie Company has been closed by Freight Agent John H. McAdoo, of the Great Northern, to ship 6,500 tons of rails and fastenings from Pittsburg to Yokohama, the shipments going via Cleveland, Northern Steamship Company, Great Northern Railroad from Duluth, and its steamship line, the Nippon Yusen Kaisha, from Seattle to Yokohama.

WE are informed that through the New York office of Fraser & Chalmers the following export contracts have been closed: Two large Riedler pumps, for irrigating purposes, to be worked at the Ewa plantation, Honolulu, Sandwich Islands. They are worth about \$60,000. Shipment is also being made of two air compressors for Japan. In ten days the first shipment of a ten-stamp combination mill for Guanacevi, Durango, Mexico, will go forward. The balance will yet take thirty days to complete. To Ecuador an air compressor and a large quantity of tools and supplies are being shipped by the same firm. Recently they were awarded a large contract for different kinds of machinery to go to Chili.

—The tack machines used by the Atlas Tack Company produce 275 finished tacks per minute.

### Machinery Notes.

—The American Blower Company, of Detroit, Mich., have received an order for a large shipment of fans to Japan, where they are to be used in connection with paper driers.

—Portable houses, it is said, are in constant demand for export. The next direct steamer to Guatemala will have on board ten of them. A reliable manufacturer claims that 75 per cent. of his business is export.

—There are enrolled in the Michigan Mining School at Houghton, Mich., U. S. A., students from Germany, Russia, South Africa, Scotland, Mexico, British Columbia, Ontario and all over the United States. The attendance is larger than ever before.

—The contractors of the railroad from Ocos to Santa Catalina, Guatemala, are coming to New York. All the equipments and rolling stock will likely be purchased here, as the concession given by the Government of Guatemala was to an American company.

—The Rogers Locomotive Company, of Paterson, has received a notification by cable that an order for eighteen heavy freight locomotives, of the Mogul pattern, had been awarded to it by a large European railroad. It is said that all the largest locomotive building concerns of the world competed for the work.

—Mr. C. K. Turner reports having made unusually large shipments of galvanized steel windmills. The demand, particularly in Argentina, is constant. He attributes the increase of business due to the fact that Americans have greatly improved in the manufacture of windmills from wood to galvanized iron.

—A new set of bit-stock drills has been put on the market by the New Process Twist Drill Company, Taunton, Mass. The set includes the following sizes: 2, 3, 4, 5, 6, 7, 8, 10 and 12-32. The cases are highly polished, and are furnished in natural wood, stained cherry or orange. The size is plainly stamped on each drill.

—It is reported that L. P. Rose & Co., of New York, are preparing to ship several more carloads of railroad picks to England. They say that the demand for agricultural machinery, particularly for France, has been better of late. They have engaged freight for three carloads of hay fork tines for that market, to be shipped immediately.

—Mr. Ricardo Aleuce, for many years with the export firm of Messrs. Munoz & Espriella, has lately returned from an extensive trip through Colombia. He has established himself for his account in this city as an export merchant, doing business principally in Colombia and directing his attention to the hardware and machinery trade.

—The Henry R. Worthington Hydraulic Works have lately obtained a number of orders for pumping machinery for Mexico. They have a representative travelling constantly over that republic. Upon his return, which will be in about two weeks, an engineer of the company will start to erect some of the work, principally in the province of Yucatan.

—The Edgar Thomson Steel Works, at Braddock, are turning out two orders from the Far East. China has given the Carnegie Company one order for 8,000 tons of steel rails. They have been shipped to Baltimore, to go by steamer. The light-grade rail plant of the Edgar Thomson Works recently started on an order for 5,000 tons of "T" rails for Japan.

—The Star Drilling Machine Co., of Akron, O., has just shipped to Pueblo, Mex., one of its No. 3 drilling machines, which is to be used in that section of country for drilling artesian wells. It is also working on a No. 6 machine for Australia, which is to be shipped via San Francisco. This machinery is to be used in Australia for putting down wells for water supply for cities and towns.

—An engineer travelling in the Argentine Republic writes home that "in the province of San Juan an American syndicate has bought a tract of land known to contain considerable gold ore. With our improved American machinery wonders can be done here in gold mines, and the time is not far off when considerable enthusiasm will be awakened in America over these incalculable resources."

—A self-heating sad iron, which has the advantage of being heated either by gas or alcohol lamp, has recently been perfected. The iron is hinged and has two polished smoothing planes, an upper and a lower. One is being heated while the other is in actual service; then they are reversed. Each iron is supplied with interchangeable burners and a reservoir to hold the alcohol when that is the fuel used.

—The Ball Engine Company, Erie, Pa., the celebrated builders of automatic engines for electric purposes, have recently shipped several engines to Mexico, and one of 200 horse-power to Russia. They have an order at the present time for one 400 horse-power vertical cross compound condensing engine, direct connected to Siemens-Halske Electric Company generator, to be used for electric power in a large steel works at Marlepol, Russia.

—Writers are frequently annoyed by the difficulty of removing worn steel pens from the friction jaws of the ordinary penholder, which are set firmly in their place by corrosion of even the best of ink. The holder patented September 22d by Ernest Ackerman, of Chicago, Ill., will render this operation easy and speedy, as the pen is held in place by a tongue in the tube having a spring stem, which opens out at right angles with the holder, thus releasing the pen. When the pen is fast in the holder the operating stem closes in a depression in the side of the holder.



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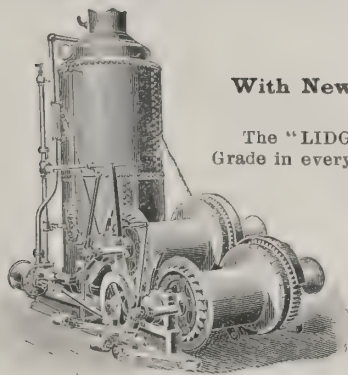


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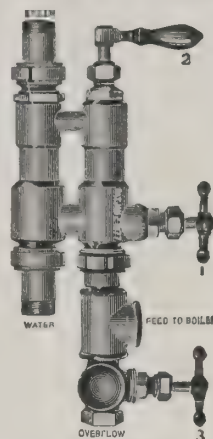
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Patented May 7, 1895.

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This machine is fully covered by Letters Patent No. 538,918, and all infringements will be prosecuted to the fullest extent of the law.



### Paper Bottles.

THE days of the glass bottle are numbered, says an exchange. It is announced that in the near future bottles will be made of paper. A company has been formed to manufacture them.

The advantages claimed for the paper bottles are many. A glass bottle is extremely liable to break, and in the case of old wine the breakage of a bottle in a bin causes serious loss. The paper bottle, it is claimed, cannot be broken unless considerable force is used. Bottles have been made of toughened glass and jars have been covered with wickerwork, but still the breakages occur. It is claimed that unbreakable paper bottles will stop this.

Perhaps paper bottles can be manufactured for about half the cost of glass bottles, and can be made water-tight as well as air tight. As brewers well know, it is no easy matter to make a glass bottle that is all right when beer is the liquor it contains. All kinds of experiments have been made to accomplish this result, but none have succeeded. With the paper bottles the matter will be comparatively easy, as the paper will give when the cork is driven into the neck of the bottle, and will be sealed perfectly.

Glass bottles, too, will freeze and their contents spoil. In the paper bottles the liquid can defy the efforts of the frost king. This will mean a saving in more ways than one. There is no occasion for the laborious packing in straw that has to be done in the case of glass bottles. The paper bottles, being practically unbreakable, there is no need for straw as a safeguard against rough treatment while in transit, and as the papier-maché will keep the contents warm there need be no packing to keep the cold out.

The paper bottles are an American idea, but the trade in them will be carried to all parts of the world. No item of loss in ocean traffic has been greater than that caused by the breaking of bottles during the rolling of a ship in rough weather. On this account the paper bottles will be welcomed in every quarter of the globe where liquor is shipped for export.

### New Material for Skylights.

A NEW ENGLAND firm has just concluded a very satisfactory test of a new translucent fabric for use as skylights in manufactories and other buildings requiring large areas for the transmission of light. The light weight of the material permits of a simple, inexpensive and light form of skylight construction. The fabric is said to have marked advantages over glass in being practically unbreakable, and for this reason all leaks from breakage or cracking are avoided. The fabric consists of a transparent material in which is imbedded wire cloth—after the manner of the construction of wire glass. The cloth has twelve meshes per inch, which give sufficient elasticity and flexibility to the sheet, permitting ready adjustment to any shape that the roof structure may take. The manufacturers state that the material in use for the test has been in place for seven years, and has never leaked during that time nor caused any expense for repairs. Several large modern industrial establishments have been fitted up with this material, among others the General Electric Company's new shops at Schenectady, N. Y., and the new forge shops of the Berlin Iron Bridge Company, of Connecticut. The fabric is strong and in panels 18x36 inches in size, and has carried a weight of over four hundred pounds per square foot. The amount of light transmitted is equal to that of ribbed glass one-quarter of an inch in thickness, is practically fireproof, and costs from 20 to 30 per cent. less than the ordinary glass skylight.

### American Coal for Europe?

COALS may yet be carried from America to Newcastle. The new turret steamships are found to be well adapted to ocean coal traffic, and a company has been formed to build a line to run between American ports and the continent of Europe. Ships of this design have been carrying coal for some time between Australia and Montreal.—*St Louis Globe-Democrat*.

Such a result would be no more extraordinary than many of the transformations that have marked the economic and industrial development of this country. The United States has been so busy with its home trade that it has made only a beginning, so to speak, in the matter of working up trade abroad. The time may come when it will be the principal source of supply for most of the staple commodities used by the world at large.—*Troy Times*.

AMONG the number of novel inventions patented recently is a self-propelling sleigh, made by a Brooklyn man. The vehicle is capable of operation by an unskilled person and can be used on even or uneven ground, or upon ice, the surface of which is either smooth or rough. It may be run at varying speeds, according to the will of the operator, and is so constructed as to be incapable of being injured in passing over rough ground or by having its propelling device come in contact with an obstruction. The power necessary to drive the vehicle is derived from a gasoline engine arranged beneath the rear seat.

THE great inconvenience of transporting baby carriages has been overcome by the invention of a collapsible or folding carriage. This when in use has the general appearance of an ordinary baby carriage and may be, when occasion requires, folded into a small compass for transportation or storage. The bottom of the body of the carriage and the truck frame are inseparable, so that when the carriage is folded the several parts fall within the dimensions of the frame. When the carriage is folded the wheels lie upon the bottom board of the body, the lower surface of which becomes the outer surface of the package. The change is readily effected and in a simple manner.

### Exhibits of Competing Manufacturers.

WHEN competition displaces the leadership of any given article in the markets of the world, the causes are frequently set aside by alarm as to their consequences. To understand the causes is the best way to remedy or restrain the disaster. This in a general way has been one of the neglected studies or duties of manufacturers of goods for foreign markets. When the tide of demand falls below the usual average, and sales are few and unprofitable, and what was once a profitable market for one manufacturer is now monopolized by another, there is a cause for this displacement, as there is for the fall of an apple or the ascension of a feather. To get at this cause, resulting in the displacement of trade, it is with industry and commerce as it is with bodily ailments or disease—the diagnosis of a physician is essential to locating the source of the trouble and providing its cure or remedy. Under the present stress of international competition the commercial mind is being forced to a recognition of the causes behind the ebb and flow of demand in particular forms of product. As a means to an end, the exhibits of samples of foreign goods are becoming a feature in modern business education. We have such an exhibit in Philadelphia, by which much valuable information can be secured, not only as to what other markets demand, but also to the nature of the products with which we have to compete. The same system is being adopted in Great Britain, and it has already done much in explaining the reason why British trade in some markets is being crowded to the wall. The colonial markets, which by the rights of kith and kin would supposably be a market for British producers, are being freely occupied by European and American traders and their special wares. These include machinery and tools of all kinds, textile fabrics, glass and porcelain and wood-work of all kinds or types. From comparisons made of these products with those of British manufacture it is evident that, while cheapness is often of more commercial importance than quality, yet in other matters essential to the welfare of trade the competing article is manifestly in the lead. In evidence of this statement we quote the following from a British contemporary:

"As far as quality and price are concerned it does not appear that our foreign rivals are greatly in advance of us, and we must confess that it is somewhat puzzling to discover reasons why such goods as those shown should be preferred above our own, when some of them are certainly of inferior quality, while the prices of those of a better class are on a par with our own. At the same time there are details in which we have something to learn from our competitors. While we pack some of our hardware—locks, for instance—in untidy brown paper parcels, both Germany and the United States send them out in neat and substantial cardboard boxes. In the way of agricultural tools, too, it is not difficult to see why the American article is preferred. Spades for heavy digging and excavating and stable manure forks are made as light as is consistent with the necessary strength. Quite naturally those who have to use articles of this class, if the choice lies with them, will unhesitatingly select an article which is not only lighter, but of a shape which more easily deals with material. The fact that the average British-made stable fork is a few ounces heavier than one of American make may appear a trivial matter, but these are little things which produce preferences and prejudices. Of course it would be impossible for the governors of the colonies to send home heavy machinery and agricultural implements under the present arrangement, though they might send photographs of them. It is admitted, however, that what we have said of American agricultural tools applies also to their implements—they are lighter and better designed to effect their purpose, and herein, no doubt, lies the secret of their success."

There is a lesson in this quotation not without its value to our exporters. Our foreign trade is rounding out into a national ambition, and if by such exhibits as we have noted valuable information could be secured, the more we have of them the better our commercial and producing power.—*Age of Steel*.

### American Inventive Genius.

IT appears from the recent report of the Commissioner of Patents that more than one-third of the world's patents are granted by the United States alone. How are we to account for the fecundity of inventive genius which is so far in advance of other nations of so much older civilization? Why is it that foreign nations, which are descended from the same projectors, are so far behind in this respect? One reason, evidently, is the practical character of the American mind. The great mass of American people, lettered and unlettered, are toilers. They are brought constantly in touch with the forces of nature, and readily learn to adapt means to an end. The institutions under which we live, moreover, beget self-reliance, and thus stimulate inventive activity. While we are indebted to Europe for scientific discoveries like those of Jenner, Harvey, Pasteur, Koch and Roentgen, Europe is indebted to us for industrial and mechanical triumphs like the steamboat, the cotton gin, the telegraph, the sewing machine, the telephone and the electric light. European discoveries are rather of the laboratory and the closet, while American discoveries are of the field and the workshop.

Unlike England, also, we have encouraged the upbuilding of a diversified system of industries. Possessed of almost every variety of resources, we have promoted the development of all alike. In this manner the inventive faculties have found a wider scope for their exercise.

—A cablegram was received recently by a large agricultural machinery manufacturer for three carloads of implements to be shipped immediately to Australia. The same party mentions the fact that thus far this year they have shipped more machinery to Australia than they have during the two previous years of 1894-95.





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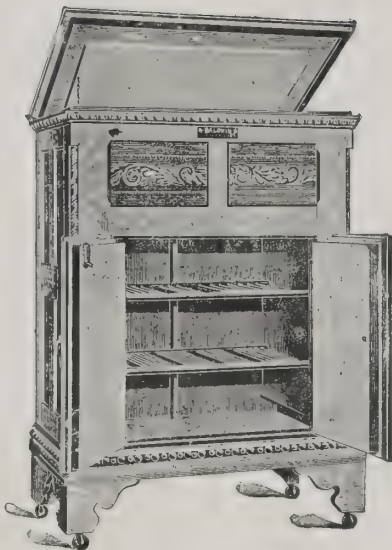
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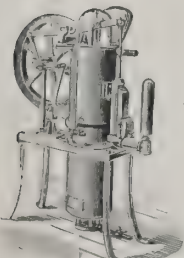
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WATER YOUR LAND  
AND WATER EVERYTHING  
DEPENDENT UPON WATER

WITH THE

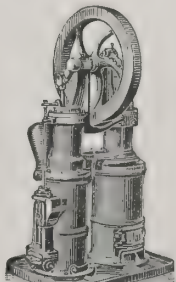
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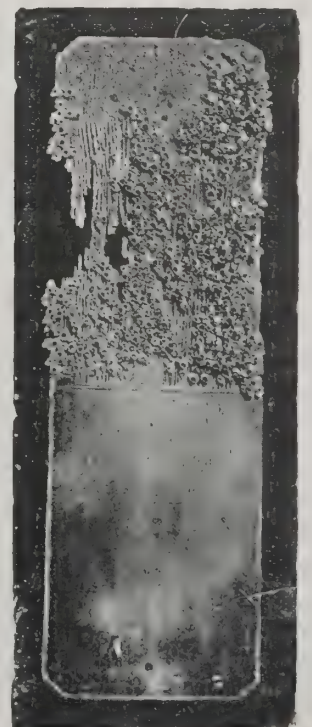
JERSEY CITY, N. J.

U. S. A.

### REMARKABLE FACT.

This cut is a copy of a photograph of a board having one end painted with New Jersey Copper Paint, manufactured by Harry Louderbrough, proprietor of New Jersey Paint Works, Jersey City, N. J., U. S. A., and placed in the water at Port Royal, S. C., for five months. Upon the unpainted end you can note the ravages of the salt-water worm so destructive to wood, and also the large number of barnacles that have fastened upon it. Observe the painted end, where New Jersey Copper Paint was applied—it is in splendid condition.

The board here represented was placed in the water at Port Royal, S. C., by me, and left in the water five months. The painted end was as good as when it was placed in the water.  
MILLS EDWARD,  
Master-Schooner "Florence Shya."





### American Furniture in England.

THE subject of an European market for American furniture has long been one that has agitated American furniture manufacturers. Much time and considerable money has been expended by local manufacturers in investigating the market and deciding whether or not it will pay, from a financial standpoint, to conduct branch stores in the world's metropolis for the purpose of opening up a market in the old world for Grand Rapids furniture. A party of local furniture men recently returned from Europe, where they investigated the furniture house now being conducted at No. 71 Paul street, Fennberry, London, by Stickley Brothers of this city. Albert Stickley of the firm returned recently from London, where he had been with a party of local manufacturers. He is extremely reticent on the condition of the European market and its possibilities for American goods, but said, in the course of an interview, that the establishment would be continued. He holds that English furniture is better made than American goods, that it is made in more correct design and is placed on the market better, and also that the English consumers are better posted and educated on furniture styles than are their American cousins. The styles of the world are practically made by England and France, and they are slow to pick up new styles or adopt any other than those of their native land. Mr. Stickley says that he thinks the English market the best in the world, as it controls the purchasers from its colonies as well as from the South American republics and other countries where American dealers would have exceedingly hard work to enter with their goods.—*From Herald, Grand Rapids, Mich.*

### Furniture Made of Paper.

JUST at present an experiment is being made at building all the furniture of unpretentious form of compressed paper, says the *Illustrated American*. This does for the living rooms what aluminum has done for the kitchen; literally decreases the weight to a point where a child is able to move the largest piece. It is not proposed in this process to detract in the least from beauty of shape or grace and elaborateness of ornamentation, but to lessen the price as well as the weight. The first products in the way of paper furniture were finished in enamel paint, and a double colonial bed of paper with all its clothing, its pillows and mattresses, was lifted about by a 16-year-old girl.

"But will this new material wear?" is the query sure to be asked by housekeepers, who are hopefully testing the new pressed paper and aluminum bathtubs and finding them much to their liking.

### Nothing Like Leather.

THE returns of trade continue to exhibit a large increase in the exports of American manufactures of nearly all descriptions. At the rate of increase for the first three months of the fiscal year 1896-97 the total exports of manufactures for the year will amount in value to \$270,000,000. With the strong impulse that has been given to this trade the probability is that the manufactured exports for the current fiscal year will greatly exceed the above figures; but this would be \$40,000,000 in excess of the exports of American manufactures for the fiscal year 1895-96, which greatly exceeded these exports in any previous year.

The significance of this movement is to be especially noted in the steadily growing exports of iron and steel, leather and the finished products of wood. For the year 1895-96 the exports of iron and steel manufactures, including agricultural implements, railway cars and carriages, amounted in value to \$49,623,793, and the returns of trade indicate that these exports during the current fiscal year will amount to not less than \$60,000,000 in value.

Last year the exports of leather and its varied manufactures amounted in value to \$20,290,964, and they are still rising. In the last fiscal year the exports of wood and its manufactures increased in value to \$31,947,108 from \$27,115,907 in the preceding fiscal year. As the official returns show, the march of this trade is still onward, indicating for the current fiscal year exports of wood and its finished manufactures to the value of \$40,000,000.

THE terrible use made by the Communards of 1871 of petroleum for conflagrative purposes produced such an impression on the French mind that people recoiled even at the mention of kerosene. So the American kerosene lamps, which were then just beginning to get a foothold in France, were relegated to the limbo of dangerous innovations. Then came the exhibitions of 1878 and 1889, with our particularly good show of new, improved and artistic lamps. The memories of 1871 were quickly forgotten, and to-day the use of candles and the old "pump lamps"—gas has never been a general means of domestic lighting in France—has gone down before the American substitute, which has not only invaded the Parisian bedroom and parlor, but has even found favor in the chateaux along the Loire and has worked its way into the plain homes of the remotest villages. One of the American lamp exhibitors received so many orders during the exhibition of 1889 that he established a branch store in the best part of commercial Paris, where he has been doing a thriving business ever since.

—One of the Burlington (Vermont) carriage manufacturers has just completed a carriage which is to be shipped to Sydney, Australia. The carriage is built for two persons and is about three times as heavy as an ordinary vehicle of its kind. It is intended for use where the roads are of the primitive sort and will probably be drawn by three horses. This is but one of several carriages which have been sent abroad from this manufactory.

### American Lead-Pencil Competition.

CONSUL STEPHAN, at Annaberg, Germany, in a report to the Department of State, gives publicity to a complaint of a leading German manufacturer of lead pencils relative to cheap American pencils. The manufacturer quoted says: "The valuable cedar wood is wasted in a barbarous manner in America; whole districts of the finest forest land have been cleared, but never replanted, so that we obtain always more rarely really good cedar wood, and the blocks which we are now obliged to use supply only half as many pencils as formerly. Not only does the cost of the production of the pencils rise considerably in consequence of the bad wood, but the American industry pours upon the market its surplus product of thousands of gross below cost price and so depresses the price in countries which impose only low duties or none at all. The consequence of this is that the German manufacturers can only compete at a loss and that the trade in cheap markets, such as India, Mexico, Japan, Australia, etc., is as good as lost. The English market has been literally swamped of late years with cheap American pencils at ridiculously low prices. The conditions in other countries are almost as unfavorable to the German export trade as in the United States. Italy, Russia and France impose immense duties on pencils, and in France the use of German pencils in schools, public boards, railways, etc., is forbidden."—*Kuhlow's Trade Review.*

### American Shoes in Foreign Markets.

ONE article of American manufacture which seems to be reaching out for new worlds to conquer is American shoes. And our boots and shoes have made a triumphant entry into several countreis already with a bright prospect of securing further victories.

An English correspondent of the *Philadelphia Ledger* writes interestingly of the foothold obtained in Great Britain by American shoes. He says that an American manufacturer can turn out a pair of shoes and place them on the London market at quite 30 per cent. less cost than can be done by an English maker. He thinks that American shoes have come to make a long stay in England, the people being sure to appreciate a good article, especially if it is cheaper than the one they have been accustomed to. In regard to quality he pays the following tribute to American-made shoes: "I can safely say every lady who has once worn an American shoe never buys any other sort, unless, indeed, it is impossible to obtain the American product. For ease and flexibility, combined with lightness and durability, I don't know anything to touch an American shoe when properly made." This admiration for American shoes appears to be shared by other nations, for he goes on to say that French bootmakers and manufacturers have sent agents to the United States to study American methods and introduce them in their own factories. The same report comes from Germany.

### Exports of Paper.

THE *New York Times* of November 22d says that a constant and stimulating increase in the foreign orders for American paper is the chief feature of that branch of industry now. Mills are starting up or increasing their working force throughout this State and in New England. About \$30,000 worth of paper was exported from New York during the week which ended November 18th. Of that large quantity, \$10,000 worth was sent to Melbourne, \$4,725 to Mexican ports, \$2,160 to London, \$2,715 to Liverpool, nearly \$500 to Manchester, \$3,578 to Wellington, \$680 to Buenos Ayres, and about \$600 to Hamburg.

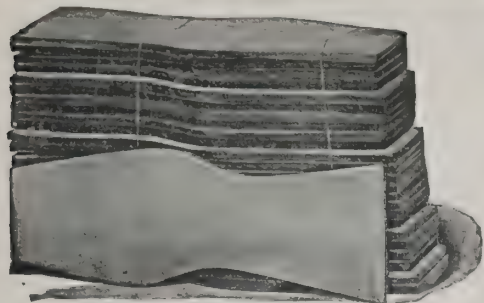
The exportation of paper from this country thus far this year has been greatly in excess of the shipments in 1895. For the nine months ended September 30th last the aggregate shipments amounted to \$2,107,700, as against \$1,711,131 for the corresponding period of last year, showing an increase of more than 23 per cent. For the month of September alone the increase was about 42 per cent. There is a belief in the paper trade that the commercial conditions during the coming year will be favorable for the exporting of American pulp to Great Britain in particular.

### Acetylene Gas.

THIS new illuminant, for which so much has been prophesied and hoped, in the last two years, seems to be steadily gaining in favor. A Western firm is now supplying individual plants which consist of two vats or tanks, the gas being generated in one and the other serving as a reservoir for storage. The gas is evolved from calcium carbide and water through the chemical action which takes place as soon as the two come in contact, and as the calcium carbide can be easily transported and stored it is thus made possible for every individual to have his own gas plant. Acetylene produces a strong white light far superior to the ordinary gas light, and it is claimed can be produced for a great deal less. The introducers say an ordinary burner can be run for about one fourth of a cent per hour.

It is said that Li Hung Chang is anxious to get telephones and phonographs from Mr. Edison. If this be true there is little doubt that the inventor is ready and willin to supply the needed commodities. Phonographs he has, we all know, and unless his right hand has lost its cunning which enabled him to turn out the two or three hundred types of telephone, of which specimens were shown at the Lenox Lyceum six years ago, he should be well able to furnish telephones as well. Mr. Edison by this time should also be free from the old contracts that checked his ardor and literally threw him out of the telephonic business.





American shoemakers and shoe-menders have got ahead of you. They don't buy whole sides or sole-leather now.

A shoemaker wants 2 or 3 grades and 4 or 5 thicknesses.

We cut sides, make 8 grades and 15 thicknesses, sell the cobbler the grades he wants, and the rest, including the waste, to somebody else, who wants that.

All well served; no waste; no using leather because you've got it.

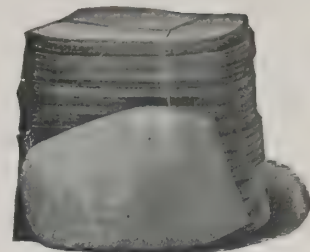
We do this business better than anybody else—it is a close wholesale business.

Do you want to know about it?

BAXTER SCHENKELBERGER & CO.,

350 Congress street, Boston, U. S. A.

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**THE DENSMORE,** "The World's Greatest Typewriter."  
WRITES 84 CHARACTERS.

**LIGHTEST KEY STROKE, HANDIEST, QUICKEST, STRONGEST.**

Represented in more than 200 Cities in the United States and in

FROM THE U. S. GOVERNMENT.

DENSMORE TYPEWRITER CO.

Gentlemen—We have now in use in the Bureaus of this Department nearly eighty Denmore machines. We have no complaint from the users of them, hence we conclude they are giving entire satisfaction. Respectfully,

(Signed) HIRAM BUCKINGHAM, Custodian.

{ DEPARTMENT OF THE INTERIOR,  
WASHINGTON, Nov. 23, 1895.

**FREE:** Illustrated pamphlet with testimonials from leading concerns.  
Active, responsible **DEALERS DESIRED** in all open foreign cities.

**DENSMORE TYPEWRITER CO., 316 BROADWAY, NEW YORK, U. S. A.**



**'96 JENKINS '96** is the Perfection  
of Joint Packing.

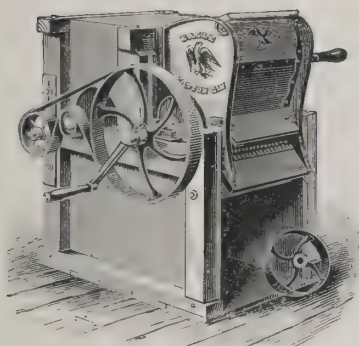
**INSTANTANEOUS, DOES NOT SQUEEZE OUT**

and not necessary to follow up joint. 'We guarantee it to last for years on any and all pressures of steam, or any kind of joint where packing is required. **DOES NOT ROT, BURN, OR BLOW OUT,** therefore the **BEST FOR ALL PURPOSES.**

Call for and insist on having **'96 Jenkins '96** stamped like cut.

**JENKINS BROS., 71 John St., New York, U. S. A.**

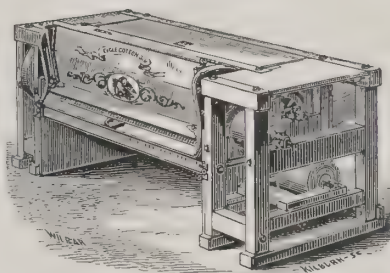
## EAGLE COTTON GINS.



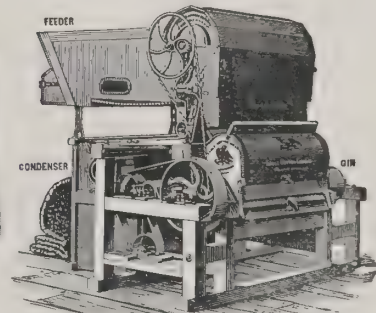
These Gins enjoy a **BETTER REPUTATION** THAN ANY OTHERS OF THEIR CLASS IN EXISTENCE, and are **PREFERRED** to all others made, on account of their **STRENGTH, SIMPLICITY, DURABILITY,** the amount and **EXCELLENCE** of the work they accomplish, and the **RAPIDITY** of their operation.

For further details, illustrated Catalogues will be furnished on application.

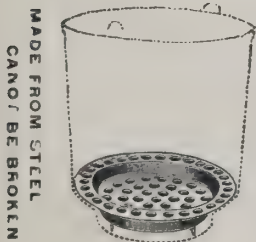
**Eagle Cotton Gin Co.** { FORMERLY Bates, Hyde & Co. } **Bridgewater, Mass.**



Power Gin with 12-inch Saws.



Power Gin with 10-inch Saws, with Feeder and Condenser



**SAFETY KETTLE BOTTOM.**

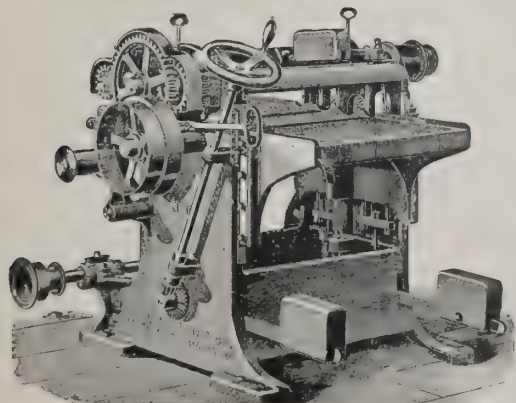
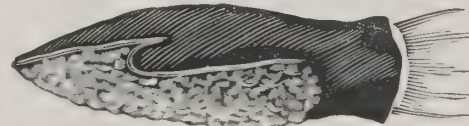
Prevents Meats and Vegetables from burning while cooking. Can be used for various purposes, either as Steamer, Broiler, Toaster, etc.

**Stove Polishing Mitten,**

FOR BLACKING AND POLISHING A STOVE.

It is one of the most valuable articles ever introduced in the household. Keeps the hands clean. Every woman will appreciate it after one trial. Easily fits the hand, has a waterproof back, and the whole front is made of the most durable and soft sheepskin, tanned with the wool on, superior to all others. **With each mitten we give a dauber.** By using the Stove Polishing Mitten, blacking a stove ceases to be dirty and disagreeable, which every lady dreads; for in the old way she knows it will take twenty-four hours to get the blacking out of her finger nails. But our mitten does away with all that, for she can make her stove shine like a mirror, and in one minute go to the parlor entertain company, make bread, or sit down and sew on the finest white goods, **without a speck of blacking on her hands.** \$18.00 per gross F. O. B. at New York.

For Particulars address **DIAMOND HARDWARE CO., 620 Atlantic Ave., Boston, Mass., U. S. A.**



No. 93. Panel Planer, 24 inches wide, 6 inches thick. Weight, 2,000 lbs.

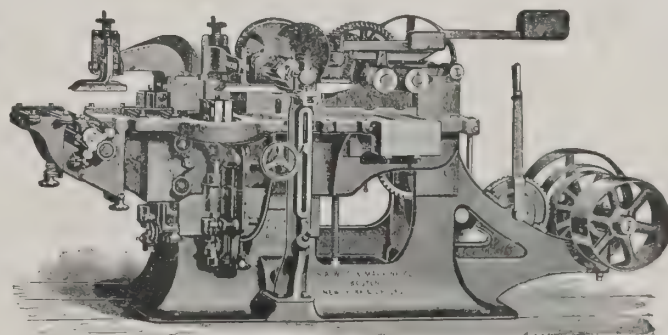
Send for Catalogue "F" at once, illustrating and describing

**HIGH-GRADE  
Wood-Working Machinery.**

**S. A. WOODS MACHINE CO.**

BOSTON, MASS., U. S. A.

Correspondence solicited.

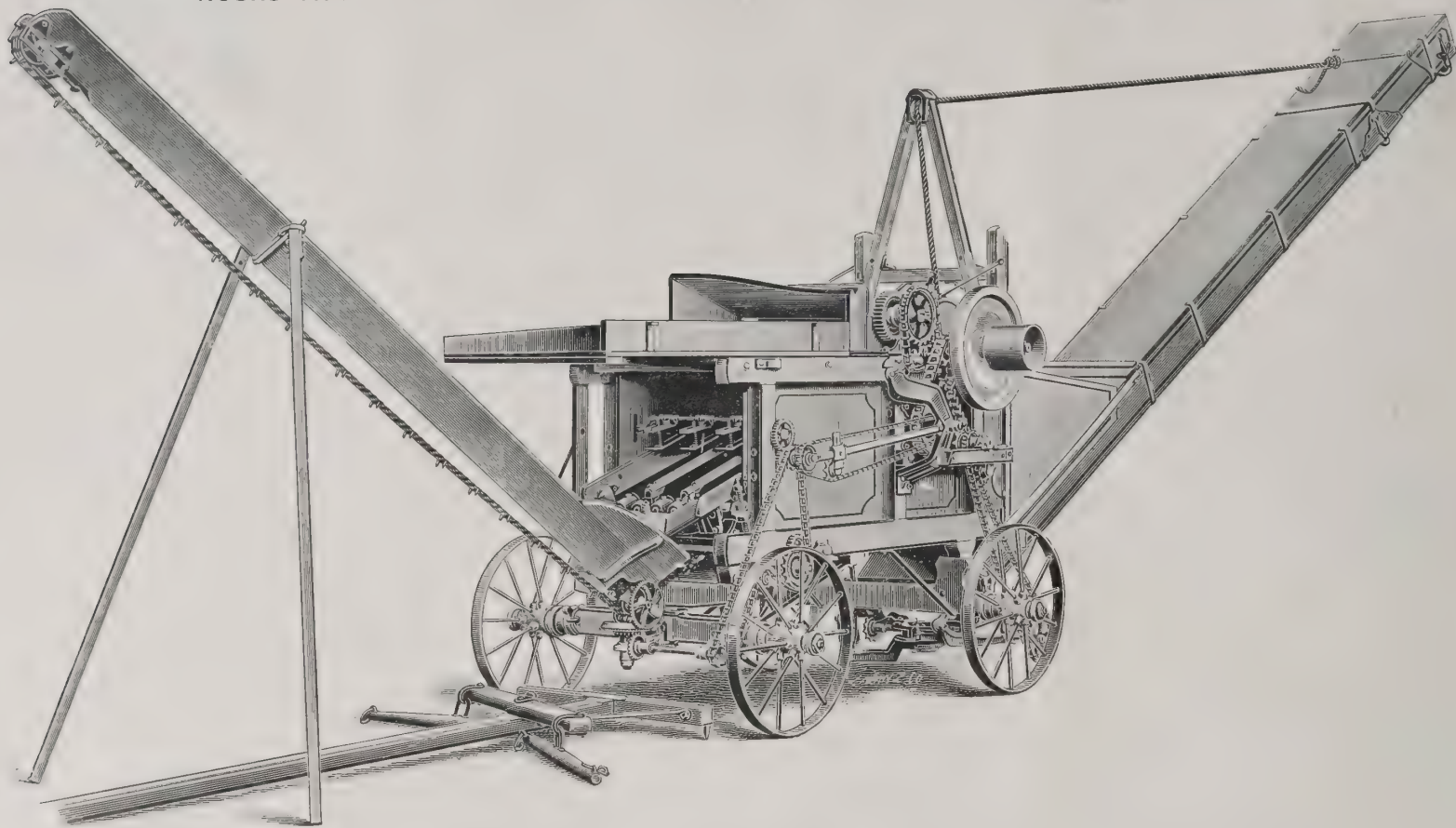


No. 170. Outside Moulding Machine.  
Works 4 sides, 7, 8 or 9 inches wide. Weight, 3,000 lbs.



# "Keystone" Corn Husker and Fodder Shredder

HUSKS THE EARS AND SHREDS THE STALKS INTO THE BEST FODDER KNOWN.



Used in the United States, Mexico, Central America, Chile, Uruguay, Argentine. It is strong and durable, and does excellent work. Shredded fodder is best. Send for full description and Export Price List.

Made by

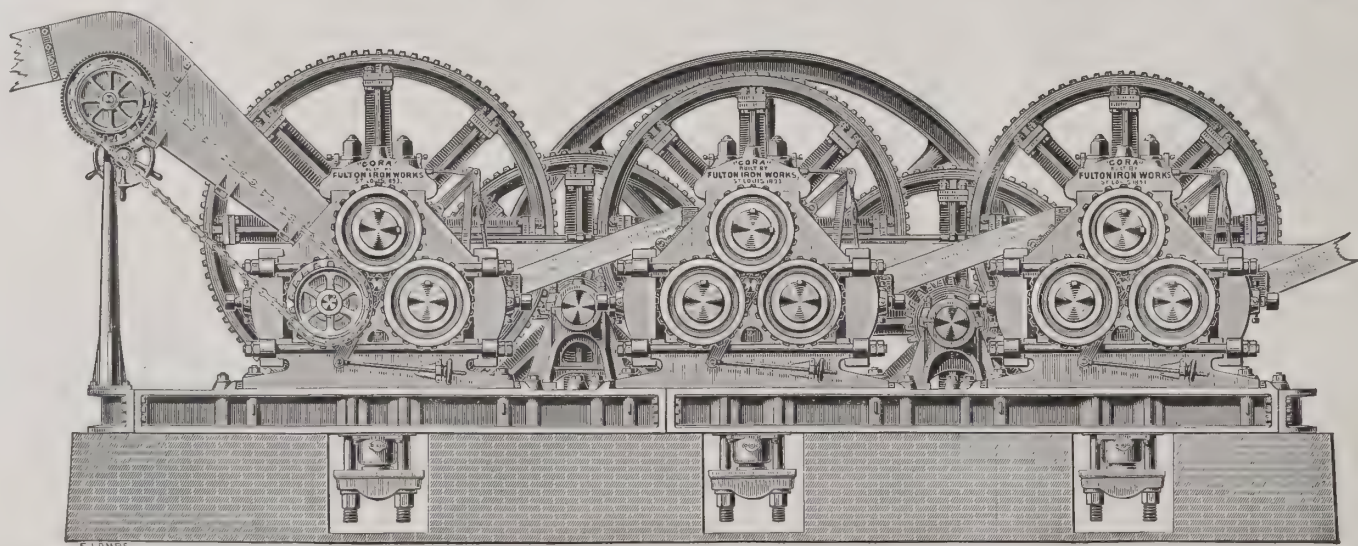
**KEYSTONE MANUFACTURING CO.,**  
STERLING, ILLINOIS, U. S. A.

Address Export Office,

**KEYSTONE MANUFACTURING CO.,**  
B 19-21 Produce Exchange, New York, U. S. A.

# "CORA" Nine-Roller Cane Mill.

CORRESPONDENCE SOLICITED.



ESTIMATES FURNISHED.

Built by **"FULTON IRON WORKS,"** St. Louis, Mo., U. S. A.

Per S.S. "COPTIC."

FULTON IRON WORKS, St. Louis, Mo.

HONOLULU, H. I., June 17th, 1895.

Dear Sirs: The nine-roller mill and Corliss engine built and erected for us by you last year has given perfect satisfaction, and we take pleasure in furnishing you with the following report covering work performed by it during the season just closed. Days grinding, 104 $\frac{3}{4}$ ; Tons of cane ground, 61,617.928; Tons of cane ground per day, 588.238. Extraction: 92.49 per cent. total sugar; 82.13 per cent. of cane; Dilution, 7.91 per cent.; Fibre in cane, 11.02 per cent. Average load on hydraulics, 313.2, 334, 344.5 tons.

It is hard to say just what is the capacity of this mill, as our boiling house is not of sufficient size to admit of a prolonged test, but we would say that we have ground on a short run over 50 tons of cane per hour, and with an increase of from 50 to 75 tons in the load on the hydraulic obtained an equally good extraction. We believe we have the best mill on the Islands.

Very truly yours,

EWA PLANTATION CO.,

E. D. TENNEY, Secretary.





DEVOTED TO THE FOREIGN TRADE IN AGRICULTURAL MACHINERY AND IMPLEMENTS

### About Floating Curds.

**QUESTION**—In making cheese the curd sometimes becomes spongy before it sours and rises and floats on whey. Please give cause and manner of handling curd in such cases.

**Reply**—Floating curds, as the difficulty mentioned is commonly called, are due to a decomposition of the milk caused by the action of a germ brought into the milk through various but not accurately known circumstances. The curd becomes spongy, as said, and the vesicles are filled with gas, often of an offensive odor. Unless the curd is well managed the cheese soon putrefies, and in the best cases it is always of inferior quality.

As heat kills all sorts of these germs, the practice of the cheesemakers is to heat the whey with the curd in it to a temperature of 100 degrees and leave it so until acid is developed to a moderate degree—that is, when it is slightly perceptible to the taste—when the whey is drawn off and the curd is left some time longer until it is distinctly acid. The degree of acid is to be gauged by the experience of the cheesemaker. There is no set rule in this respect. It is the acid which destroys the offensive germ, and of course the degree to which this has been developed in the curd rules the degree of acidity. Fine cheese cannot be made of such curd, but by good management a fair quality may be secured in spite of it. This trouble mostly happens when the pastures are failing and the water is badly infected by decomposing matters. It is also prevalent when the cows are overheated by exposure to the hot sun and the milk is overheated in consequence. Want of cleanliness is often a cause of this trouble, as stale milk left in the pails or other utensils infects the milk in this way. It goes to show the necessity of providing a surplus of fresh food for the cows at this season of the year, as well as of securing a proper supply of pure water.—*Montreal Herald.*

### Plymouth Rocks.

**THE** Plymouth Rock fowl is to-day known, admired and profitably bred from the inhabitable limits of the British possessions on the north to the boundries of the United States on the south, from the Atlantic Coast on the east to the Pacific Coast on the west, and it has crossed the waters, finding a welcome in the countries beyond the seas and on the islands thereof, until to-day in America there are more Plymouth Rocks bred than there are of all other so-called "thoroughbreds" combined.

It is pertinent to inquire why this is so. The answer need require but few words—it is preëminently an all purpose fowl, adapted, from its hardiness, to all climates, and equally at home and ready for business in any of them. It is a universal hustler, and the best market poultry bird ever known, having the size, shape and habits that everywhere, other conditions being equal, return the most dollars and cents for feed and labor given. As a general proposition, all domestic fowls end, if profitable, by "going to the pot." The Plymouth Rock pays as well as any, performs its mission living as well as any—better than most—and pays better than any other breed when it goes to market, its earthly career ended. This last quality is the secret of the success of the Plymouth Rock.—*Market Basket.*

**GALVESTON**, Texas, maintains her position as the first cotton exporting point of the world, as the following comparisons of cotton export show:

	October.	Two Months.
Galveston.....	\$11,102,171	\$16,440,347
New Orleans.....	12,165,068	16,334,023
New York.....	2,859,055	4,715,621
Savannah.....	1,982,535	3,247,105

Thus it will be seen that the port sending the greatest amount of cotton for the two months of the season is Galveston.

**GERMANY** is a large consumer of American hard woods, and until recently the demand in that country was supplied through the English markets. Walnut logs of good size sell readily both in Liverpool and London. Large shipments of hard-wood lumber have recently been made to European markets, but the prospects of any further cheap addition to the supply are very poor owing to the scarcity of tonnage and consequent advance in freight rates, which is a most important item in the cost of timber delivered abroad. There has been a brisk export demand for box shooks, chiefly for shipment to England and the Spanish West Indies.

### American Hard Woods in Europe.

**THE** demand for American hard woods in Europe is growing, and oak leads the foreign shipments, although tulip poplar, ash, gum and black walnut, whenever a good quality can be secured, are in some demand. European consumers like the quality of American oak, and since it is known to be plentiful here it will probably be in increasing demand. Cottonwood has been shipped to Germany in considerable quantities, where cheap wood is required for furniture and other uses. Much of this lumber is forwarded from New Orleans, and since a great part of the oak, ash, poplar, cottonwood and other timbers demanded by the foreign market is in the Southern States, it is not improbable that lumber for foreign markets will be largely shipped in future from the Gulf ports. In speaking of this matter the *Northwestern Lumberman* says that the European market requires lumber cut of exact thickness and of accurate length, trimmed so as to have the butts square and true. Space for piling in the yards of the Old World is an object, so that random, uneven lengths are objectionable, and since the foreign buyer insists that he shall have just what he bargains for, quality should be strictly attended to.

### Agricultural Notes.

—It is estimated that the United States will export to England this season 1,000,000 barrels of apples. And they will be good apples.

—An export firm of this city, with branches in San Antonio, Tex., reports that for the last three weeks seven carloads of American hogs have left Kansas City for their account daily, for shipment to Mexico.

—Mr. Prospero Schiaffino, consular agent for Italy at Baltimore, has been notified that December 19th bids will be opened in Rome by the Italian Government for the purchase of 600,000 kilogrammes of Virginia leaf tobacco.

—H. G. McDowell has made a shipment of 12 merino sheep to Cape Town, Cape Colony, Africa. The sheep were valued at \$5,000, heavily insured. One buck alone was worth \$1,000. The animals were shipped to New York, thence by steamer to Cape Town.

—Large quantities of buckwheat are being shipped from different points in Allegany County, New York. It is estimated that 50,000 bushels will be shipped from Wellsville alone; 10,000 to 15,000 bushels have been billed from this point to New York for export to Germany.—*Exchange.*

—Plans are being prepared by an American company for the construction of two large sugar estates in the Island of Santo Domingo. A Cuban planter of experience, an engineer, together with a representative of the company, will start within a month to overlook all the conditions offered in that island.

—Under present improved commercial conditions we are all neighbors. A few years ago seed from an orange grove on the Indian River, Florida, was planted in Italy. Fruit from this seed was lately sold in Chicago. The boxes in which the oranges were shipped from Italy were made in Bangor, Me.

—During the last year no less than 10,000 American horses have been sold in London alone. A large number are used for the omnibuses and street cars. The cab master and smaller dealer profess not to touch them, the former believing, and possibly rightly, that the majority of foreign horses are somewhat soft.

—The lumber trade between the United States and Mexico has become so heavy that a steamship and schooner line, which will be devoted to that traffic exclusively, has been established. The company's vessels, four in number, will ply between Mobile, Ala., and Sabine Pass, Tex., and all of the Atlantic ports of Mexico. Sam Parks, of this city, is the general manager of the company for Mexico.

—Shipping of oleomargarine to South Africa has of late been carried on very extensively by the Oakdale Manufacturing Company, of Providence, R. I. Mr. James Niblo, their agent, with offices in this city, reports that since their traveller reached that country not a vessel has left port with less than 500 cases. The next direct steamer sailing for Port Elizabeth and Durban will have on board over 1,600 cases. The same results cannot be had in the Central and South American markets, for the simple reason that dealers in those markets are not willing to sell the material for what it is, and prefer a low grade of butter, principally obtained in European markets, to the high grade of oleomargarine turned out by American manufacturers.



## Trade with Africa.

THE Bureau of Statistics furnishes some interesting figures regarding the commercial relations between the United States and Africa. The rapid settlement of that continent by Europeans has created a demand for American goods hitherto undreamed of, and when it is shown that within one year our exports to Africa have more than doubled in value some idea may be gained of the importance, present and future, of the relations between the Eastern and Western continents. The table of exports, as prepared by the Bureau is, in part, as follows:

	1895.	1896.
Agricultural implements.....	\$257,112	\$348,665
Books and printed matter.....	18,410	27,976
Wheat.....	111,033	1,556,562
Flour.....	44,474	729,731
Carriages and cars.....	98,436	262,432
Cotton cloth.....	345,798	697,902
Bicycles.....		20,628
Fruits and nuts.....	14,830	43,448
Builders' hardware, saws and tools.....	147,417	165,987
Sewing machines.....	6,478	18,872
Miscellaneous machinery.....	830,372	1,056,878
Leather.....	26,884	38,992
Spirits of turpentine.....	16,361	17,550
Mineral and cotton-seed oil.....	694,720	922,932
Canned and salted beef, bacon, hams, fresh pork and lard.....	141,880	335,306
Seeds.....	313	2,434
Tobacco and manufactures of.....	257,031	357,638
Lumber and manufactures of.....	822,963	1,110,997
Total of this selected list.....	\$3,834,021	\$7,709,951

Of imports from Africa only two of any considerable importance are reported. One of these is Egyptian cotton, which was \$3,895,043, as against \$2,053,554 in the corresponding nine months of last year, and raw sugar, which increased from \$410,755 to \$3,073,410. Coffee increased about threefold, but it was less than \$16,000 in the past nine months; hides and skins from Africa dropped from \$768,257 to \$275,508; rubber dropped from \$22,359 to \$1,212; nutmegs, pepper, etc., dropped from \$91,207 to \$39,522, and ivory from all quarters, the greatest part of it coming from Africa, decreased from \$495,833 to \$129,652.

With our marvellous resources we should be the base of supplies for almost the entire world, and with proper facilities for foreign transportation our product would soon double itself. The increase in our African trade is only one example in many that might be cited.

## Two New Customers.

THE visit to this country of Prince Hilkoft, the Russian Minister of Communications, may be accepted as marking the date of the revival of those close trade relations with Russia which were taking shape when interrupted by the war of the rebellion.

It was an American that built the first railroad in Russia, and Russian enterprise has always had a preference for American engineering talent. The industrial development of the great Russian Empire is now making giant strides, and it will furnish magnificent opportunities for our co operation. Orders have already been placed in this country for steel-making and oil-refining plants, and the American makers of machinery of all kinds have a market offered them in Russia sufficient to tax their capacity very heavily.

Our other new customer is Japan, which proposes to come with a single step from mediæval feudalism to nineteenth-century conditions. The manufacture of iron and steel lies at the base of all other manufactures, and Japanese engineers and experts are now in this country looking around for proposals for a steel plant for Japan with a capacity of 100,000 tons a year.

The conquest of the markets of the world is not beyond our reach if we can keep our industries clear of tariff obstruction and trust restrictions.—*New York World*.

THE Westlake (La.) *Herald* says that the mill there and a couple at St. Charles have made a contract to furnish a couple million feet of Calcasien pine for shipment to South Africa. This is the first shipment of the kind and is somewhat in the line of experiment, but there is no business reason why the venture should not be a success, and should it prove such these mills will be given options on an almost unlimited amount of shipments in the near future. This is but the beginning of what promises to be an enormous export trade, profitable and easy to handle when once acquired.

—We are informed by W. Toritch & Co. that they have just exported the first samples of American tobacco to St. Petersburg and Rostov-on-Don.

—F. W. Bennett & Co., Bristol, England, recently wrote the Department of State that George W. Swan & Co., of that city, would like to be put in communication with the large cask merchants or coopers of the United States who would be in a position to supply them with casks of all descriptions.

—A commission house in San Francisco, referring to the export trade in sugar-making machinery, says: "The foundries on the Pacific Coast have no reason to complain, our house alone having done quite a business in sugar machinery. A short time ago we completed a contract to supply a sugar plantation in the Hawaiian Islands with a large cane mill, two vacuum pans, a triple effect and all the other machinery necessary, including water-tube boilers. Since the Cuban sugar market has been in such a deplorable state the sugar industry of the Pacific Islands has been greatly stimulated."

## Items of Interest.

THE Ohio Falls Manufacturing Company, of Jeffersonville, Ohio, has received from the Sierra Madre and Pacific Railway, of Mexico, an order for 150 box cars, 7 passenger coaches, 3 cabooses and 1 private car.

THE largest foreign shipment of machinery ever made from Waynesboro, Pa., was that which was recently made by the Frick Co., consisting of an ice-making and refrigerating plant for Johannesburg, South Africa. It constituted eleven carloads.

MANUEL S. LOTA sailed last month for Mariacaibo, Venezuela, taking with him two American engineers and an outfit of well-sinking machinery. He intends sinking artesian wells for the purpose of supplying that city with fresh water, and he has also plans for the erection of extensive waterworks in this connection.

MANILLA rope has become somewhat scarce owing to the war in the Philippine Islands, and on this account sisal rope has been substituted to a certain extent in the filling of foreign orders. It is claimed that such improvements have lately been made in the manufacture of sisal rope that it now in many respects equals the manilla product.

MR. R. J. GROSS, vice-president of the Brook's Locomotive Works, at Dunkirk, N. Y., when in this city recently received an order from an export commission house for a 42-inch gauge locomotive, to be shipped to Cape-town, South Africa, for use in the Transvaal gold fields. The Brook's Locomotive Works seem to be growing very popular in foreign countries.

MR. HENRY C. PAYNE, who some years ago was prominently identified with the house of Robert Boker & Co., of Mexico, and was subsequently connected with THE AMERICAN EXPORTER in Chicago, has gone to Australia, where he will represent the well-known export house of Flint, Eddy & Co., of New York. Mr. Payne's wide experience in and thorough knowledge of the American export trade qualify him for the work he now has in hand, and we wish him every success.

HIRSH & LOWENSTEIN, ginseng root dealers, of New York, presented Li Hung Chang with an ebony case filled with exceptionally large and fine specimens of ginseng root. This root is found all over the United States and Canada and is exported to China, where it is used as a drug. Its scarcity makes it very valuable, and it commands exceptionally high prices compared to other crude roots and herbs. Some of the above specimens were the largest ever seen by the oldest dealers, and no doubt will be prized highly by the eminent Chinese statesmen.

AN exchange says that a Winona (Minn.) company has arranged to manufacture and sell in the Northwest a new grain separator for farm use. It is said to be especially adapted for seed purposes, and far in advance of anything now on the market. The new separator is constructed with the fan in the centre, which permits of a light and heavy blast at the same time. It gives the farmer his seed absolutely clean, and separates a great variety of seed grains perfectly. It has been thoroughly tested in Indiana, where it was invented, and has proved thoroughly practical.

ALUMINUM coffins are the latest, and the New York, Pittsburg and St. Louis undertakers carry them in stock. They are of uniform width, square ends and vertical sides. They are finished, says the *New York World*, with a heavy molding around the bottom and at the upper edge and with pilasters at the corners and a round molded top. Aluminum caskets are not covered, but finished with the metallic surface burnished. The non corrosive qualities of aluminum as well as the lightness of the caskets recommend them. A 6-foot aluminum coffin weighs about 100 pounds. They are, however, very expensive.

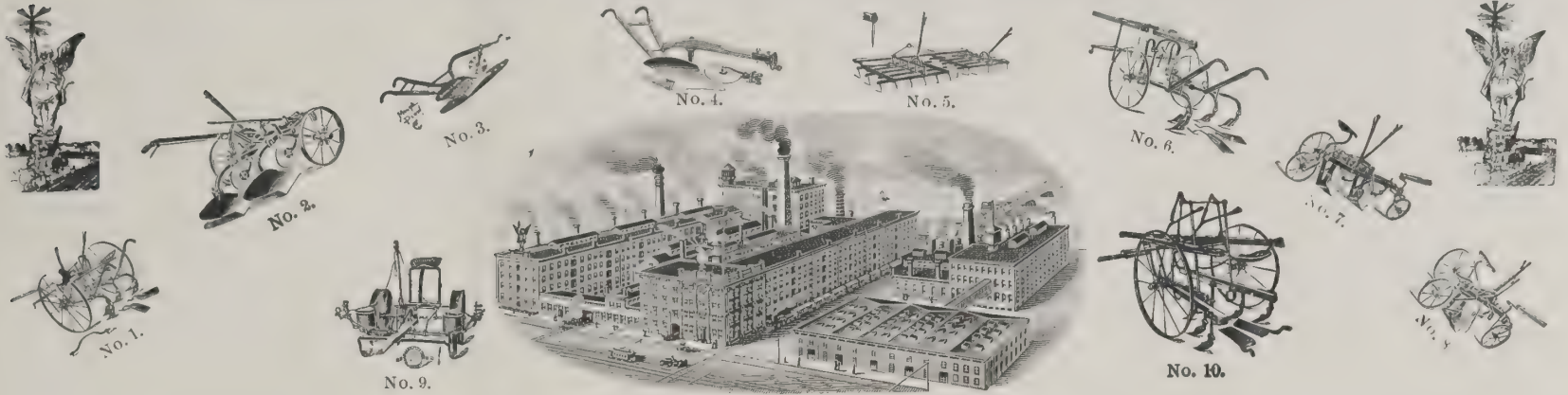
THERE can be no doubt as to Australia offering a splendid market for American goods. The people are enterprising, and if not much given to the beating of tomtoms are a sturdy and pushing people. There are already some 12 lines and more of steamships doing the carrying trade to and fro between Australia and the European and American continents. If this show of trade is made in a territory but sparsely settled, what is it not likely to be when its Sydneys and Melbournes can be counted by the dozens and its destiny as an empire finally established? We share a common language with these people and are closer in kinship than we think, and the manufacturers of the United States have every inducement to commercial fraternalism with the common nation of the Antipodes.—*Exchange*

THE Charleston Importing and Exporting Company has been organized with a capital stock paid in of \$100,000. The books of the company were opened, and in one day that amount was subscribed. The company will do a general importing and exporting business, beginning its operations at once. At the outset the major portion of its attention will be devoted to the importation of coffee. It will have its own steamer connection with the leading Brazilian and South American ports, and it is announced that its first cargo of coffee will be landed in that city within the next few weeks. The company is backed and indorsed by a number of leading business men and capitalists of Charleston, and begins business under the most auspicious circumstances. Mr. Bremer, who has been made president and general manager of the company, has had a wide experience in the business to which his attention is now called.



MOLINE, ILL.  
U. S. A.**MOLINE PLOW COMPANY,**MOLINE, ILL.  
U. S. A.

MANUFACTURERS OF THE BEST GRADES OF

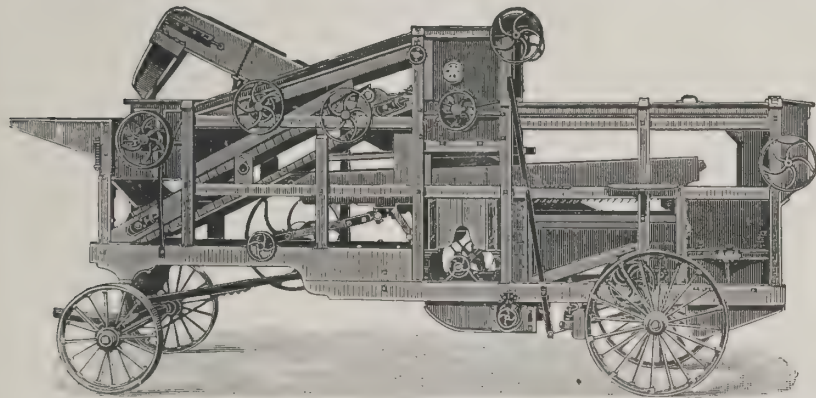
**Sulky, Gang, Wheel Walking and Walking Plows, Harrows, Disc Harrows, Planters, Seeders, Drills, Cultivators, Hay Rakes, Beet Machines. Etc.**No. 1 Dandy Combined Riding and Walking Cultivator.  
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OF ALL KINDS AND SIZES FOR LOCOMOTIVES

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The most perfect miller for coffee ever offered. It will do the finest work on tender as well as hard coffees, and do it without waste or breakage.

**These Machines are in successful operation in many of the largest Coffee Houses in this country, and are well worthy of investigation by Handlers of Coffees.**

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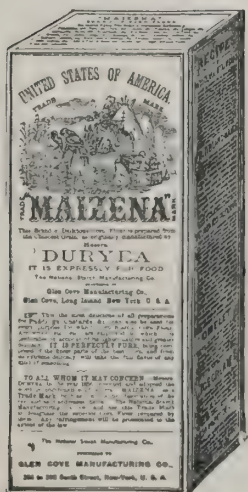
This is a brand for a preparation from the choicest parts of Indian Corn, or Maize, making a healthy and nutritious article of food, and a most

**DELICIOUS TABLE LUXURY.**

ITS PURITY AND DELICACY ADAPT IT TO BEING USED IN A GREAT VARIETY OF EXQUISITE DISHES.

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Put up exclusively by THE NATIONAL STARCH MFG CO., successor to (Messrs. DURYEA) GLEN COVE MANUFACTURING CO., N. Y. U. S. A., in 40 and 20-pound boxes, in packages of 1 lb. and 1/2 lb., and may be obtained through all importing houses of South and Central America, and the West Indies, and all export houses of the United States and Canada.

**None GENUINE without "DURYEA" appearing on the face of Package.**



# ELECTRICAL NEWS.

## Electric Shoe-Blackening Machine.

THE electric shoe-blackening machine has for some time been employed in shoe-cleaning parlors, public buildings, hotels and club-houses, and other places where an incandescent circuit can be tapped. It is now proposed to manufacture a small machine of the same character for domestic use. It is calculated that if there be but a single person in the household to use the machine daily it will save its cost in twelve months, and where there are several male members in a family the saving will amount to quite an item, as the cost of running is small. The operation of the machine is very simple. The foot is placed on a raised tread and the revolving brushes which close over it can be regulated as to speed and position by the person using the machine. There is no soiling either of the hands or the clothing. If desired the domestic machine can be fitted, as its larger prototype, with a nickle-in the slot attachment, so that its actual saving capacity can be exactly ascertained. The machine now more or less familiar to the public is about thirty-six inches high and eighteen inches wide, and occupies about as much space as an ordinary chair. It is operated by dropping a nickle in the slot and will run a minute and a half, giving ample time for blackening and polishing both shoes. On the top is a dial with a traversing finger and sections designating the several operations, such as cleaning, blackening and polishing toe; change to other brush for shank and heel, and so on for the second shoe. The two hollowed-out brushes, revolving at the rate of 1,700 revolutions a minute, move in opposite directions, so that they can act on either the front or the back of the shoe. Each brush serves as a cleaner, dauber and polisher for the portion of the shoe which touches it, liquid blackening being automatically projected upon it in small quantity at just the proper instant. Each shoe must, of course, be applied to both brushes and the best results are obtained by gently moving the shoe about, "feeling" for the bristles, so that every portion of toe, shank and heel will be reached. The case has front and back doors, and the brush shield is removable, so that the mechanism is easily accessible for cleaning, replenishing the blackening, repairs and collections.

## Electricity in Japan.

AMERICAN electrical engineers may find it not unprofitable to keep a close eye on electrical developments in Japan, says an exchange. During the last session of the Japanese Imperial Diet it was agreed to appropriate a sum of 12,800,000 yen, or more than \$14,000,000, spread over seven years, for the extension of the telephone service, and the work of construction is being actively carried on at various important places. The number of new subscribers in the four centres of Tokio, Yokohama and Kobe, under the expanded system, will be over 13,000, and in Kioto and thirty-five other places where the service is to be newly established there will be 6,800. A considerable number of branch lines will also be established in places of less importance, so that telephonic communication will be within the reach of a large part of the population of Japan.

The people everywhere are eager to take advantage of this means of communication, and it is stated that at present in Tokio alone there are over 2,000 subscribers, and more than 2,600 applicants are waiting impatiently to have the privilege extended to them also. Arrangements are being made in Tokio to grant 500 new applications during the present year, in order of priority, and during the next two years 1,500 applications will be accepted, the intention being to increase the number of subscribers until it reaches 10,000. Notwithstanding the activity of the Japanese in these matters, many of the applications which are being granted this year were sent in as far back as 1893. The way is being made much easier for American manufacturers by the marked preference which the Japanese have shown for American methods. This is strikingly instanced in the fact that three electrical experts have lately been sent from Japan to this country for the purpose of studying the latest developments — *Philadelphia Press*.

CHICAGO has adopted a tower wagon for the purpose of enabling its employees to conveniently reach and trim the arc lamps with which the streets of that city are lighted. This vehicle is constructed on the lines of tower wagons used by trolley companies. A workman can clean 250 lamps per day with the use of this wagon as against 60 lamps by the old method of trudging with ladder and kit from lamp to lamp.

THE electric foot warmer and foot rest combined is now to be had. It can be used only where a connection can be made with an electric current. There are thousands of people whose occupation confines them in small booths, cashiers' offices, ticket offices and the like throughout the Winter months, and where it is impossible for them to have a stove on account of the limited size of the compartments. For use in such places the electric foot warmer is especially adapted, and it will also be found very useful to invalids and elderly people, who in order to keep themselves warm are frequently forced to make others uncomfortable around them.

—Kingston, Jamaica, with a population of about 50,000, will shortly have an electric trolley system. About ten miles of road will be equipped. The company making the change is an old and prosperous one, having operated the road for many years with mule power. The equipment will all be sent from New York within a month.

## Tiny Illuminating Plant.

WHAT is probably the smallest complete electric illuminating plant ever constructed has just been built by an electrical engineer in Philadelphia. It is designed for vehicles and throws a beam which will penetrate the darkest gloom and clearly reveal all objects at a distance of 100 feet ahead. The light projected by this tiny lamp can be clearly discerned as it moves across a surface more than 200 feet away. The device is nothing less than a miniature search-light. The light is supplied by the smallest storage battery that has ever been utilized for the purpose. Heretofore it has been necessary to resort to large batteries weighing from 60 to 100 pounds for this purpose, but the inventor has managed to make a 15-pound battery supply a light for eight hours without any perceptible diminution in its power. This battery can be recharged by a few bluestone jars if a central station is inconvenient, but it can be more quickly done at one of these generating plants and at a cost which makes the electric light quite as cheap as an inferior oil lamp.

Another noteworthy feature of the lamp is an ingenious method of establishing the connection between the lamp and the battery without the necessity of making the wire connections. The battery once fixed in its place under the seat remains there until its power is spent. The lamp, however, for the protection from thieves or accident, may be taken off and put on at pleasure. As the lamp is put into its place the circuit is made through the brackets which support it. If desired the lamp can be fixed on the tongue instead of the dashboard of the carriage.

## Vulcanized Rubber a Conductor of Electricity.

IT has heretofore been supposed that vulcanized rubber was a non conductor of electricity; but upon no less authority than William P. Smith, superintendent of the electrotyping department of the Bureau of Government Printing, the opposite is proven. The result of his experiments in this line have culminated in the invention by him of a process of producing a pattern and coating it by depositing upon the surface thereof metallic nickel for the reproduction of half-tones, wood-cuts, engravings or phonographic sound records. Scientific men who have carefully examined Mr. Smith's process pronounce it a decided advance and assert that it will be of very great service to the electrotyping business, obviating the very great waste of wax under the system in vogue, besides obtaining a much better reproduction of half-tones and wood-cuts. It is likely that the near future will witness the adoption of the system in all electrotype foundries. For the graphophone and phonograph he declares it cannot be excelled, and that the reproduced sound has that clear metallic resonance which is now lacking.

WE learn that an American motor car recently won a race in England in competition with about sixty others, and that it covered a distance of fifty-three miles in four hours. The race was held under the auspices of the Motor Car Club of London. A number of these motor cars were electrics, and there were only two American machines in the line. It is said that there are now fifty motor car factories operating in England, one of these employing over one thousand men. It is expected by next Spring thousands of electric cabs, landaus and parcel vans will be seen in the streets of London.

THE Berlin Iron Bridge Company, East Berlin, Conn., have a contract for a car barn and shop building for an electric road at Port au Prince Hayti. These buildings will be of steel throughout, having a steel skeleton framework covered on the sides and roof with corrugated iron. The shop is 33 feet by 70 feet, and the car barn 40 feet by 160 feet. This building is only one of many which have been gotten out by this same company for export to foreign countries during the past few months.

RECENT developments in electricity have given a great stimulus to manufacturers of air-compressing devices, and mutual aid and encouragement are resultant, friendly rivalry in this instance signifying the very essence of prosperity and industrial progress. Competition has not only been the life of trade in this line, but engineers and inventors have watched and profited by the new uses of electricity, creating as it has new fields, in many of which air power serves a useful purpose. This coöperation is seen in most of the large railway yards of America, the electro-pneumatic switch involving a combination of the two elements. Compressed air in this device in yards around Chicago is now conveyed 20 miles along the road in each direction. Electricity handles the trigger, while compressed air is the power which does the work, a striking example of an instance where the latter comes in to the best advantage.

—The electric railway is only 10 years old in the United States, yet it is said there are 1,000 such roads in the country, using 12,000 miles of track, operating 25,000 cars, and involving an investment of about \$750,000,000; moreover, this investment is increasing annually at the rate of \$100,000,000 for new roads and new equipment.

—There are more than 30,000 miles of underground telephone wires in New York City, and more than 7,500 telephone subscribers. A telephone switch-board is one of the most elaborate mechanical devices known to human ingenuity, and, with all furnishings, fixings and connections, represents a total cost of nearly \$500,000. The telephone business of New York has increased vastly of late years, but it has not increased, says the *Sun*, more than it has been improved in the public convenience. There are now nearly 1,000,000 telephones in use in the United States, and the total miles of telephone wires exceed 450,000.



# De Laval Cream Separators



Immediate and absolutely complete separation of cream from milk by machinery.

85,000 machines in use in every country in the world.

A saving of 10 to 20 per cent. in any climate, and 25 to 100 per cent. in warm countries.

Perfect separation and greatly improved quality of products.

Machines simple, durable and easily operated.

SATISFACTION GUARANTEED.

—PRICES, \$65 to \$200.—

Hand or Power. Any Capacity.

Address for catalogue or any desired particulars,

**THE DE LAVAL SEPARATOR CO.**

General Offices, 74 Cortlandt Street, New York.

## THE BLANCHARD DISINTEGRATOR



**GRINDS**

Bones, Tankage, Fertilizers, Glue, Chemicals, Soap Powder

and all similar materials,

**DRY or DAMP.**

Large capacity. No skilled attendants. No special foundation.

**SIMPLE. STRONG. COMPACT.**

Write us with sample of material.

Catalogue "B" on application.

Orders filled through commission houses.

**BLANCHARD MACHINE CO., 303 Congress St., Boston, Mass., U. S. A.**

## Dietz Tubular Square Lamp



Is most desirable for sheds and porches, also for barns' stables, outbuildings, etc., where "no smoking" is desired. This is an extra fine Lamp, made in three sizes, has no chimney, and no complication to make trouble of any sort. It has an improved burner and outside wick regulator; gives a very brilliant light that the strongest wind cannot quench—and, in general, it gives universal satisfaction. The list prices of the three sizes of this lamp are \$5.50, \$6.50 and \$8.50, and the export discount 50 per cent.

The Catalogue, which we gladly mail upon request, will give you an idea of the extent of our line of Lamps and Lanterns with prices and discounts.

**R. E. DIETZ COMPANY,**

60 Lighthouse Street, New York, U. S. A.

Established in 1840.



THOROUGHLY RELIABLE AND PERFECTLY AUTOMATIC.

Designed especially for STATIONARY, PORTABLE TRACTION AND HOISTING ENGINES, TUG BOATS, ETC.

Manufactured by

**WM. SELLERS & CO.,** INCORPORATED.

Restarts instantly after a temporary interruption of the steam or water supply.

It has a wide range of capacities, and raises the water promptly with hot or cold pipes.

We invite particular attention to this latest "Sellers" Injector which we believe will commend itself to all users of large and small steam boilers by reason of its extreme simplicity, its wide range, its automatic feature and other notable advantages.

**JENKINS BROS.,**

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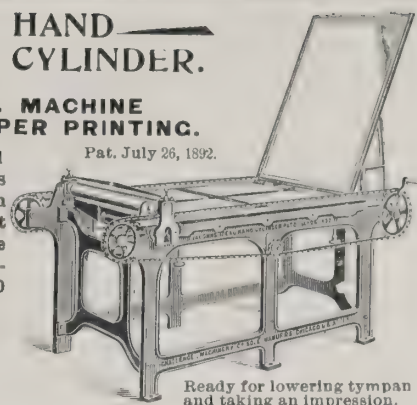
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THE MOST WONDERFUL MACHINE FOR COUNTRY NEWSPAPER PRINTING.

An impression is taken by each forward or backward turn of the crank. The press runs so easily that a boy or girl of fifteen can operate it without undue exertion. It occupies the least floor space. It is the fastest hand cylinder made. It is lightest, although built of iron and steel. 300 to 400 impressions an hour.

8-column folio or 5-column quarto, } \$146.00

9-column folio or 6-column quarto, } \$162.00



Pat. July 26, 1892.

Ready for lowering tympan and taking an impression.

Prices Net F. O. B. cars New York City. Order of any leading commission house; always send duplicate order to us. Illustrated Circular on application.

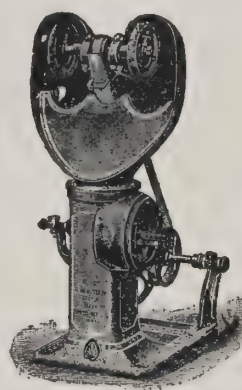
**THE CHALLENGE MACHINERY CO.**

Sole Manufacturers,

CHICAGO, ILL., U. S. A.

See page 31 in November Number for Ad. of our ADVANCE Paper Cutter.

## GLOBE BUFFER CO., MANUFACTURERS OF GLOBE BUFFER,



Globe Heel Scourer,

WEBSTER LEATHER CLEANER,

Sandpaper Belts for Buffer,

Moulded Sandpaper, Sand Cloth and Emery Cloth for Heels.

Felt and Rubber Rolls and Wheels of all kinds.



GLOBE HEEL SCOURER.

Send for Catalogue "S."

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**BOSTON, MASS., U. S. A.**

**THE SIMONDS** BOSTON 1887, NEW ORLEANS 1885, CHICAGO 1893, SAN FRANCISCO 1889, CALIF. 1890, AND INNUMERABLE AWARDS. WE MAKE SOLID TOOTH AND INSERTED POINT

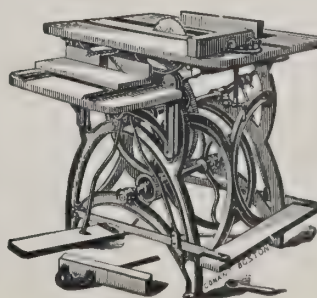
**SAWS** CIRCULAR SAWS, STRAIGHT SAWS SUCH AS GANG MILL, MULAY AND DRAG SAWS, AND THE CRESCENT GROUND CUT. BAND SAWS FROM ONE TO EIGHT INCHES IN WIDTH. ALL KINDS. OF SCROLL SAWS WE ARE THE LARGEST MANUFACTURERS OF MACHINE KNIVES IN THE WORLD.

**AND**

**KNIVES** WE MAKE EVERYTHING IN THE SHAPE OF KNIVES. OUR ADDRESSES ARE SIMONDS MFG. CO. F. M. S. S. 21 CANTON ST. BOSTON, MASS. SAN FRANCISCO, CALIF. PORTLAND, OREGON. SELLING AGENCIES L. A. KIMBALL 107 LIBERTY ST. NEW YORK CITY. SIMONDS MFG. CO. LTD. 23 MAGAZINE ST. NEW ORLEANS, LA.

## MARSTON'S FOOT AND HAND POWER SAW

FOR RIPPING, CUTTING OFF, GROOVING, RABBETING, CUTTING TENONS, MITERING OR BORING.



Weights 300 pounds. Gauges slide in planed iron grooves in top. Gears are all machine cut. Shaft and arbor are made of steel.

Price, - \$60.00.

With boring table and side treadle, \$67.00.

**JOHN M. MARSTON & CO., Boston, Mass., U. S. A.**



# "MONARCH"

## The Apex of Bicycle Perfection.

The finest equipped bicycle factory in the world (we have it) naturally produces the best bicycle—as near perfect as anything mechanical can be. Our 1896 models are the crowning glory of our unparalleled success as bicycle makers.

FOUR MODELS.

\$80 and \$100



Agents Wanted.

Write for Terms.

We also make the best of lower-priced machines, especially adapted to the jobbing trade—

DEFIANCE, eight models for adults and children, \$75, \$60, \$50, \$40, fully guaranteed.

## MONARCH CYCLE MFG. CO.

Lake Halsted and Fulton Streets,

CHICAGO, ILL., U. S. A.

MENTION THIS PAPER WHEN WRITING.

## THE BLACK MFG. CO., - ERIE, PA., U. S. A.

We build bicycles of the finest quality only and have nothing to offer either in cheap or medium grade wheels. Our discount for export is 30 per cent., and we deliver machines properly boxed f. o. b. New York. Order through your commission house and send copy of order direct to us.



TRIBUNE MODEL 27.

Price \$100. Weight 23½ lbs.

This is our standard men's wheel and is suitable for all kinds of road use. It is built in three heights of frames, 22½, 24 or 26½. The wheels are 28 inches diameter; 26 inches will be furnished if preferred. Gear, 68; options, 60, 63, 72, 73 or 80; cranks, 6½ inches, 7 inches if preferred. If not otherwise specified, all machines will be fitted with Hartford or Morgan & Wright tires. All wheels are supplied with tool bag, tools and repair kit. Regular finish, black enamel, nickel trimmings. If a lighter wheel than the above is desired, order should specify Model 21, which will weigh with light road equipment about 20½ lbs.

## Tribune Bicycles.



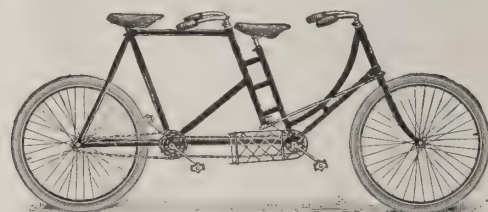
TRIBUNE MODEL 24. Price \$100.

Our ladies' wheels are built in three heights of frames, 20½, 22½ or 24 inches. 20½ inches is standard and will be shipped if not otherwise specified. Wheels, 28 inches, can be furnished, with 26 if preferred. Regular gear, 63; options, 56, 60, 63 or 72; cranks, 6 inches throw. The weight is about 24 lbs.

The Celebrated  
Cycloidal  
Sprocket.



Used on  
Tribune  
Bicycles only.



TRIBUNE MODEL 23.

Price \$150. Weight 44 lbs.

Our tandems are also built with double diamond frame for use of men riders. Wheels are 28 inches; height of frame, 24 inches; ladies' forward frame, 20½ inches. Gear, 68; can fit with 72, 76 or 80, if desired.

## GOOD AGENTS WANTED

TO REPRESENT

## The Standard Wheel OF AMERICA.



Write for Terms.



Write for Catalogue.

STANDARD BICYCLE MFG. CO., 71 Jackson Blvd., Chicago, Ill., U. S. A.





DEVOTED TO THE FOREIGN TRADE IN BICYCLES AND SUPPLIES.

## AMERICAN GENIUS IN THE BICYCLE TRADE.

THE bicycle trade is about eleven years old. In 1890 English exports of bicycles to the United States were first given a classification. The returns were as follows:

1890.....	\$324,961.07
1891.....	621,664.99
1892.....	761,352.95
1893.....	613,247.73

Then came the effect of business depression in the United States shown in a rapid decline of English exports, but it was a depression to be followed by a very different reawakening than that which English manufacturers expected. American manufactures not only stopped the exportation of English bicycles to the United States, but turned the tide of trade by fully supplying the domestic market and exporting American bicycles to England. This has been done so effectually that up to the close of the second quarter of 1896 not a single complete English bicycle was exported to the United States, while, on the other hand, from 12,000 to 15,000 high-grade American bicycles were exported to England, where they were so well received it is predicted that from 40,000 to 50,000 will follow in 1897.

When English manufacturers realized that the bicycle trade of the United States was lost to them they found consolation in the fact that Americans were not making steel tubing and England was sure of that trade. English exports of steel tubing to the United States makes the following showing:

1894.....	\$85,899.55
1895.....	507,041.29
1896, first quarter.....	231,200.36
1896, second quarter.....	130,253.84

During the periods covered by these figures steel tube making has been developed in the United States so vigorously it is expected that the tremendous drop in English exports to this country shown from the first to the second quarter of 1895 will continue and that these exports will reach the vanishing point during the year of 1897. More than this, it is probable that American-made steel tubing will be exported to England before the close of the year 1897 in sufficient quantity to become a noticeable item of American export.

Such a history as this is most creditable to the genius and enterprise of American manufacturers and is evidence that the world's markets are open to them whenever they are ready to take possession of them with American bicycles.

## Music of the Wheel.

THERE will soon be no complaint that the silent steed persists in running down the absent-minded pedestrian who complains of the absence of bell, and yell, and other devices, to warn him of the danger which menaces his safety. Among the latest noise-provokers is the ingenious contrivance now quite prevalent around New York, which turns the machine into an Æolian harp, the swift movement of the wheel through the air playing upon the instrument. The rider stretches a number of thin strips of rubber over his frame, practically making a harp of it. Every time the wheel is moved at a fair speed the wind whistles and plays with the rubber, giving a harp like harmonious combination, startling on the ear when heard at night, and yet quite pleasant to the ear when familiar with its cause. This Æolian arrangement has become very popular, and the wheels nightly whistling and singing up and down the avenues of our suburban towns are creating a new amusement and increased interest.—*Exchange*.

## Americans in English Trade.

SYDNEY LEE, in his *Cycle Trade Journal*, has this to say anent the American bicycle in Great Britain: "Agents, more particularly those in the South of England, are doing well with American cycles, and many are actually pushing them in preference to those of British manufacture, for the simple reason that the unfortunate dearth of English machines during the Spring and early Summer, and the consequent forced purchase of American machines by many of the upper classes, has, in a measure, set a fashion for such machines, so that the fashionable visitors to the more classy watering places are asking for American cycles.

"A well-known South coast agent who has several depots in various towns told us the other day that he was doing a large trade in a very well-known American machine, while he could dispose of scarcely any of an English firm of equal standing. Price, he said, had something to do with the matter, for the American machine was considerably the cheaper. People would not give something like £3 more for the English wheel when they saw it beside an apparently equally well-finished, though perhaps far less durable, American machine. And further, he maintained, that when new the Yankee wheel ran quite as well.

"We do not propose to enter into a minute criticism of the machines, but it is quite plain to us that American cycles are quite good enough to be serious rivals to the first-grade British machines, at any rate among the class of people who give their cycles comparatively little wear, and it must be remembered that it is this very class of buyers who pay the best prices and give the agent the least trouble."

## American Enterprise.

NO more forcible commentary on the strength and aggressiveness of American industries can be called to mind than the contest which is now being waged by American bicycles against the product of English factories. It has been the proud boast of John Bull for years that no country in the world could compete with England in steel and its various products, but within the last decade, year by year, the Americans have been steadily spreading out into territories hitherto occupied by the British exclusively, and to-day, although our British cousins would probably laugh at the claim, American manufacturers no longer look upon Sheffield and the other great manufacturing centres with apprehension, but enter into competition with them, confident of the superiority of the fruits of American industry, and this is true despite the fact that American workmen are better paid and in more comfortable circumstances in every way than their British brethren.

A BIRMINGHAM agent who has business connections on the Continent has recently been staying in Berlin, and on his way visited a few Dutch towns. While travelling he was much struck with the increasing sales of American cycles in Germany and Holland, and in Berlin especially a very large number of American machines are to be seen, whereas six months ago they were, comparatively speaking, unknown. He was told that at nearly all the cycle depots the sales of American machines were on the increase, and says: "If wooden rims and very light machines are in demand on the Continent, it surely behooves those engaged in the cycle industry to go with the times." A friend—the representative of a large house dealing in agricultural implements—once told him, and it is more true now than ever, that the American makers of agricultural implements had almost completely ousted the English manufacturers of reapers, binders, etc., in Germany, Russia, Austria and Hungary. The English firms would not listen to the advice tendered them by their agents in great cities and centres, and would not adopt the methods of the Yankee makers, with the consequence that orders were lost and the trade went to the States. It is to be hoped that this will not be the case with the cycle industry.—*The Engineer*.

A WESTERN firm is now introducing to the market a new wrench which has some novel points. It is calculated for bicycle and other like small work. There are no threads or screws about it to get out of order. The main jaws and handle, which consist of one piece of metal, are riveted together by two pairs of flat plates, the space between them being filled by a series of sliding sections which normally extend out even with the outer end of the jaws. These sections are kept from sliding too far either way by half-round projections on each end. Each sliding section changes the size of the wrench, so that almost any size nut can be readily handled with it.



### Chainless Wheels.

GENERAL expressions of opinion concerning the merits or demerits of chainless wheels amount to very little at this time for the simple reason that comparatively few riders ever so much as saw a cycle without a chain, while those who have actually ridden machines of the kind are among wheelmen like the planets in the firmament—extremely few and very far between. Heretofore a few chainless wheels have been made in this country, but their use has been so limited that very little is known of them by the cycling fraternity at large.

The announcement that the season of 1897 will, among other things, afford the riding public an enlarged opportunity for thoroughly and practically testing the chainless idea has added considerably to the general interest taken in the year to come. A good deal of wild talk has naturally followed. Newspapers have displayed numerous cuts of bicycles without chains and printed voluminous correspondence upholding or condemning the notion. It is easy either to praise or find fault with a bicycle on paper, but the riding test affords the only basis for useful criticism.

All persons interested in the outlook for chainless bicycles will do well to wait with patience until the wheels have been more generally used by unprejudiced, practical bicyclists. Those who fancy that they see in the "chainless" a complete revolution of the industry and advantages to the rider far beyond anything previously laid at his disposal may as well reserve their comment, and those now disposed to condemn the innovation without a hearing are quite too previous.—*American Cyclist*.

"THE attitude of the German bicycle makers toward their country's cycle press and that of the latter toward the American cycle trade is some what peculiar," says *Referee*. "Press dispatches of recent date tell us that the German makers have threatened to boycott the German papers unless they henceforth refuse business in the way of advertising from the makers in this country, who have of late been extending their fields of operation to almost every country on the face of the earth. If the story is true, and it is doubtful it merely indicates that, the statement to the contrary notwithstanding, foreign makers fear to place their goods on the same counter with those sent from this country. England and France have already had a scare over the same matter, and one may look for a cry from Russia, Spain, or some other continental country. Even if the German Government should place a prohibitive duty on American bicycles it will not prevent our makers from doing a good business in that country, for they can easily establish factories and turn out machines the equal of those made at home."

FOR a number of years inventors have been striving to get rid of the sprocket and chain and their attendant friction in the bicycle. The bevel gearing, patented June 2 by John Parker, of Philadelphia, has developed sufficient merit to interest capital, and a chainless bicycle promises to be a feature of the wheeling of the coming year. The invention consists of the combination of the crank shaft having a bevel wheel, the driving wheel also having a bevel wheel on the hub. A shaft surrounds one of the lower forks of the machine, which shaft has at one end a pinion engaging with the bevel wheel on the crank shaft and the other end with that of the hub of the drive wheel. Friction is reduced to a minimum by the use of ball bearings, and the bevel gears are encased free from dust. This method of propulsion is said to have emerged victorious from crucial tests as compared with the older styles, and its adoption is confidently expected as soon as placed upon the market.

THE London *Daily Mail* is publishing a series of articles pointing out the serious effects of the competition of American-made bicycles with the English trade in the popular wheels. Most of the English firms are expressing what the *Mail* terms "silly indifference" at the situation. There may be an awakening among the English manufacturers, however, for J. K. Stanley, one of the foremost men in the cycle trade and inventor of a well-known type of safety, in an interview is quoted as saying: "In automatic machinery America is immeasurably ahead of us. All the English makers are buying American machinery. Our English toolmakers and machinists ought to be ashamed of themselves. While we have been vainly trying to get additional labor to meet the enormous demand the Americans have been making machinery."

ALTHOUGH the single-tube tire is of English origin, and for a time all were known as the Boothroyd type—more or less in honor of the British inventor—it made little or no progress abroad. The recent "American invasion" has, however, stimulated interest in single tubes, as in everything else American. The foreign inquiries have occasioned no little comment. Manager Kelly, of the Newton Rubber Works, is among those who have been amazed by the number of the inquiries that have reached his concern without effort on their part. They appear so promising that the Newton people contemplate the establishment of a foreign depot. In this connection it is not generally known that for months past the Pope Manufacturing Company has been making a single-tube tire with a corrugated tread to meet the requirements of the export trade.

—An American bicycle factory capable of turning out 5,000 machines yearly is to be erected in England. The American machines are coming into favor in Germany and France on account of their lightness combined with durability and strength. An American machine has carried off the highest honors at the Innsbruck International Exhibition. These facts testify to the skill of American workmen and American inventive genius.

THE growth of the bicycle business in the United States has created an impression in England and the London *Times* looks forward to an importation into Great Britain next year of from 40,000 to 50,000 bicycles of high quality and of American make throughout. In regard to the ability of American manufacturers to compete with their European rivals in the industry the *Times* says: "The high price of labor, which some think a drawback, is really an advantage, because high-priced labor is so efficient, and its ingenuity in the devising and manipulating of machinery is so highly developed, that the labor cost of the completed article is less than it is with lower priced labor working under less favorable circumstances."

PAUL FLAG, the inventor of a new metal considered of very great use to bicycle manufacturers, has decided to build a factory in Hartford, Conn. The metal which he intends to manufacture has been found, after severe test, to be stronger than the best quality of steel. It admits of a high polish, and is very slow to rust.

### Our Growing Export Trade.

THE increasing demand for American manufactures is shown by the official report of the exports for the month of October of this year as compared with those for the same month last year. As it would take up too much space to enumerate all the items, we quote only enough to show what advances are being made in this trade:

INCREASE FOR OCTOBER, 1896, OVER OCTOBER, 1895.

Books, maps and engravings.....	\$54.
Brass and manufactures of.....	28,007
Building and fire brick.....	6,931
Brooms and brushes.....	2,639
Carriages and cars.....	46,502
Clocks and watches and parts of.....	32,552
Copper, manufactures of.....	23,988
Cotton, manufactures of.....	737,111
Cycles and parts of.....	305,949
Earthen, stone and china ware.....	6,070
Cordage and twine.....	29,974
Grease, grease scraps and all soap stock.....	98,089
Printers' and other inks.....	2,557
Scientific instruments and apparatus.....	25,334
Car wheels.....	3,626
Locks, hinges and other builders' hardware.....	54,839
Saws and tools.....	8,094
Fire engines.....	5,290
Stationary engines.....	13,507
Machinery, not including sewing machines, printing presses, typewriting machines, boilers and steam, fire, locomotives and stationary engines.....	638,764
Nails and spikes.....	14,403
Scales and balances.....	4,398
Wire.....	67,940
Lamps, chandeliers, etc.....	2,887
Boots and shoes.....	58,780
Roofing slate.....	16,265
Paper and manufactures of.....	12,181
Butter.....	9,582
Cheese.....	462,226
Seeds.....	1,128,660
Toilet, fancy and other soaps.....	22,201
Stationery, except of paper.....	10,734
Tin, manufactures of.....	11,535
Tobacco, manufactures of.....	57,370
Toys.....	1,203
Trunks, valises and travelling bags.....	1,011
Varnish.....	5,157
Household furniture.....	14,215
Wool, manufactures of.....	25,657

### The China Trade.

THE announcement that a syndicate has been formed in Chicago to secure and develop America's trade with China and to branch out in the construction of railroads and telegraphs suggests that it is not Chicago but San Francisco that should be reaching out for China's trade. There is little doubt that China is on the eve of great developments. The Japanese war has opened the interior of the empire to foreign trade. New ports, populous cities and new lines of commerce can be reached. New enterprises are starting. The tour of Li Hung Chang and the position given him in the administration suggest that the Government, as well as the people of the empire, is about to throw off the apathy of centuries. San Francisco should have a large and growing share of this trade. It is the natural commercial depot of trade between the Western Continent and the Orient. It needs but the men who see the opportunity and have the money and energy to take advantage of it. Trade does not always follow natural advantages. It is men more often than nature that determine the course of commerce.—*San Francisco Examiner*.

—An engineering contract for improvement of the Government dockyards at Java is pending, and a portion of this work may go to American contractors.

—The exports of all classes of manufactured goods from this country for October amounted to \$23,479,279, against \$18,778,817 in October, 1895, and \$21,684,734 in September, 1896.

—The exports of cycles and cycle material from the port of New York during one of the weeks of November amounted in value to \$74,657. Of this amount \$25,820 worth went to London, \$13,420 worth to Genoa and \$14,686 worth to British Australia.



# THE NORTHAMPTON Strictly High-Grade BICYCLE.

MADE BY SKILLED MECHANICS.

Constructed  
from the  
Best Material  
Obtainable.

Liberal  
Guarantee.



Two Models,  
Ladies' and  
Gents'.

Write for  
Catalogue.

THE NORTHAMPTON CYCLE COMPANY,  
NORTHAMPTON, MASS., U. S. A.



PRICE,

\$85.00.

American money.  
Gold or Silver.

## Cutting BICYCLES.

We want agents  
for our line.  
They are quick  
sellers and strictly  
high grade.  
Catalogue upon  
application.

## HAY & WILLITS MFG. CO.

INDIANAPOLIS, INDIANA, U. S. A.



Men's No. 7, 24 lbs., \$100.

# ACME CYCLE CO.,

ELKHART, IND., U. S. A.

A. B. C. Code. Cable Address: "ACCYCLE," ELKHART, IND., U. S. A.

ORDERS ACCEPTED THROUGH RELIABLE COMMISSION HOUSES.

ALWAYS MAIL COPY OF ORDER DIRECT TO US.

DIRECT ORDER MUST BE ACCOMPANIED BY CASH.



Women's No. 6, 25 lbs., \$100.

Export Discount, 55 per cent.

**FRAMES**—22, 24, 26 inches high; seamless steel tubing, large diameter; reinforced joints, 43 inch wheel base.

**WHEELS**—28 inches, wood or steel rims; piano-wire swaged tangent spokes nicked, barrel hubs turned from bar steel; M. & W. tires.

**BEARINGS**—Dust-proof; large balls; special steel cones, oil tempered; steel-ball races, tempered and polished.

**HANDLE BARS**—Drop, high, Ramshorn, steel or wood; cork grips.

**GEAR**—64, 68, 72, 76, 80; forged sprockets, hardened; Cranks, 6½ inch, forged; Chain, ¼ inch, hardened.

**FINISH**—Black or colored enamel, highly polished; nickeling done on copper

**EQUIPMENT**—Saddle, pedals, tool bag, tools and tire-repair outfit.

An extra set of Bearing Cones furnished with each Wheel for Export.



TRADE-MARK.

# Gladiator Bicycles.

THE HIGHEST POSSIBLE GRADE.

F. O. B. New York.  
Liberal Discount to Foreign Trade.

Four Models - \$85 and \$100.

MANUFACTURED BY



# GLADIATOR CYCLE WORKS, Chicago, Ill., U. S. A.

Catalogue upon application. Cable Address: "GLADICYCLE," Chicago.

## Patee

### '97 Model Now Ready.

Patee bicycles have a world-wide reputation because they are always "up to date" in every particular, and also because only the very best material is used in their construction.

They are built by the oldest and best-known high-grade bicycle men in America, and the '97 model embodies some new and special features that will fascinate wheelmen and dealers instantly.

The one-piece crank shaft and cranks, the thorough dust-proof device, the quality of tool steel in bearings, the manner of re-enforcing, the adjustable bar and manner of locking in the head are all new and special features used exclusively on the "Patee" (our own patents).

Do not contract for '97 without getting our catalogue and prices and seeing sample. It is unblushingly and emphatically the best bicycle in the world for the money, and is guaranteed equal to any bicycle in the world. American list, \$60.00. Liberal discount to dealers. Do not be afraid to write. We want your business and will take pleasure in telling you more about our wheel. Address

**PEORIA RUBBER & MFG. CO.,**  
PEORIA, ILL., U. S. A.

MADE BY  
THE  
Peoria Rubber and Manufacturing Co.





ENVOY.

None but expert mechanics employed in their construction.  
 Absolutely high grade in every detail.  
 Best wheels ever offered at anything like the price.  
 Write for catalogue and full information as to terms, etc.

BUFFALO CYCLE CO., Buffalo, N. Y., U. S. A.



FLEETWING.



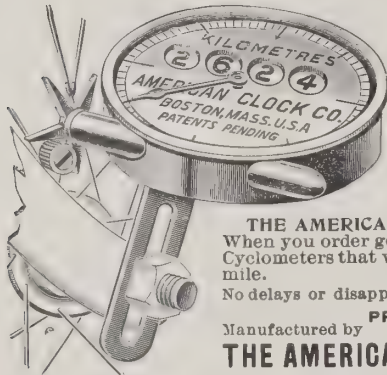
MADE UPON HONOR.  
 SOLD UPON MERIT.

The Most Popular 1896 Wheel  
 IN THE UNITED STATES.



Our Export Figures are interesting and will be quoted on application.

BELLIS CYCLE CO., - INDIANAPOLIS, IND., U. S. A.



AMERICAN Easiest to Read!  
 Miles and Kilometers. **CYCLOMETERS.**

Ten Thousand and Repeat  
 (NOT One Thousand).  
 THE AMERICAN is not a Dinky Toy, too small to be of any use, with parts too delicate for practical, everyday service.

THE AMERICAN has a world-wide reputation for Accuracy. When you order get the AMERICAN; if you do not you may get Cyclometers that will register from 40 to 150 feet short in every mile.  
 No delays or disappointments; our factory production, 2,000 per day.  
 PRICE, \$7.35 PER DOZ. NET.  
 Manufactured by  
 THE AMERICAN CLOCK CO., Boston, Mass., U. S. A.

NIAGARA BICYCLES.

Strictly  
 High  
 Grade.

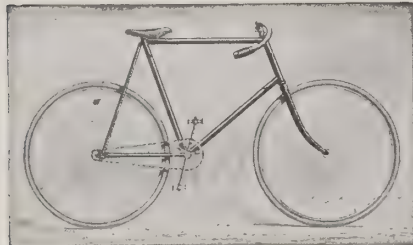


Retail  
 Price,  
 \$100.

Reliable agents wanted, to whom liberal discount will be given and territory protected. Correspondence solicited.  
 Terms and Catalogue upon application.

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SUPERB — OWEN BICYCLES — SUPERB



SUPERIOR { Design.  
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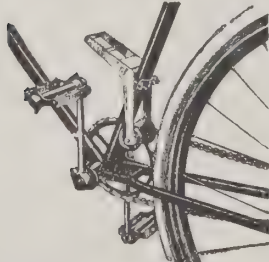
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THE OWEN OUT-COASTS THEM ALL.  
 Write for Catalogue and Terms.

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THE BEST BICYCLE BRAKE IN THE WORLD.



THE MANSFIELD

Brake has no equal. It is made of best steel, nickel plated, roller of hard wood, with vulcanized fibre bearings and friction washers arranged to automatically adjust themselves for gradual or effective work; will hold the heaviest rider; insures absolute control of wheel at all times. It is absolutely the best made and is bought by every rider who sees it. Retail price \$2.50 each, gold; discount to trade, 40 per cent. Bicycle dealers will find this Brake a most effective seller, and the manufacturers invite sample orders of one dozen or more, and request those who order through commission merchants to send a duplicate of order to them direct.

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Only Absolutely Safe and Comfortable Saddle  
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Consists of  
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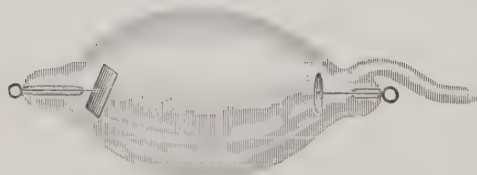


Can be  
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 man, woman  
 or child.

An invention of a leading surgeon. A long-felt want. Price, \$5.00 net.  
 Liberal discount to dealers. Complete description furnished,

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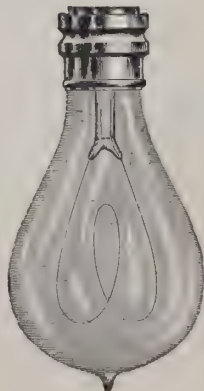


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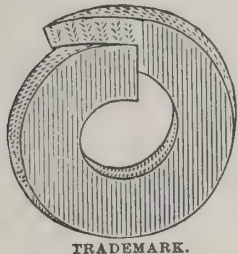
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Drills, fitting ratchets  
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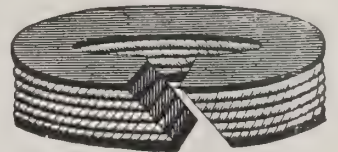
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Less friction than any other known Packing. Never grows hard if directions are followed. Does not corrode the rod. EVERY PACKING FULLY WARRANTED.

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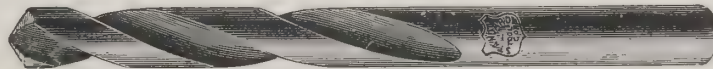


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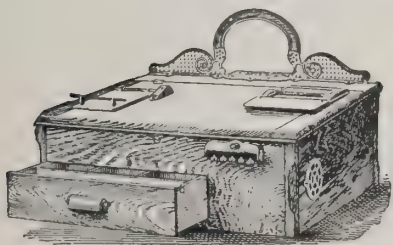
Increase Twist Drills.



CATALOGUES SENT FREE ON APPLICATION.

Bit Stock Drills for Metal or Wood, Taper and  
Straight Shank Drills, Reamers, Sockets, Chucks  
and extra length drills for Electrical work.

## BUSINESS IS DULL!

Write us for  
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But that is no reason for not watching every dollar that is taken in and paid out by you and your clerks. Indeed, these are times when you can least afford not to have a cash system for keeping track of the business you are doing. Our Recorder will do the work of a cashier whose salary for six weeks will pay the entire cost of the machine, freight included. Absolute protection against FORGETFULNESS.

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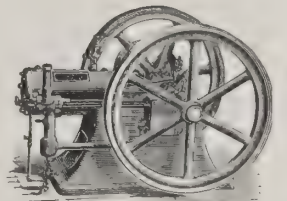
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cubic feet gas per horse power per hour. The simplest, most economical and best power. No engineer required; no coal; no fire; no danger. Sizes, 2 to 50 horse power. (Special attention paid to secure packing in heavy cases for export). Goods delivered New York, San Francisco or New Orleans. Cable Address, "Webergas," Kansas City. State size wanted.

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This is a practical and durable combination of a Plier, Wire Cutter and Hammer, in a most convenient form, and is a labor-saving tool, for in using these pliers you always have a hammer in hand ready for use. The Cutters have a compound leverage that enables them to cut wire easily. The Hammer has a serrated face that prevents slipping in driving staples, and the whole Plier is made of hardened steel throughout, and is put together with Bolts and Nuts, so that if the cutters should ever get broken, or from excessive use should become too much worn, they can be readily and cheaply replaced. This plier has been endorsed as the best tool for the purpose ever placed upon the market.

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Pumps for Every Service.

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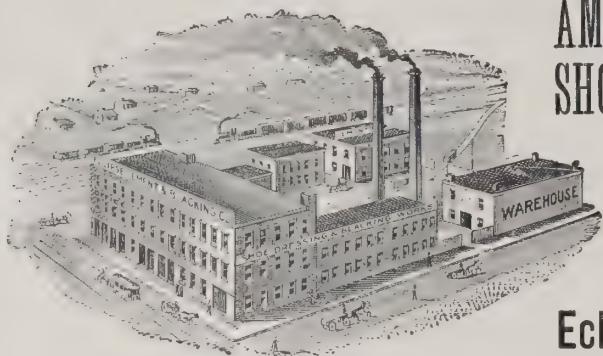
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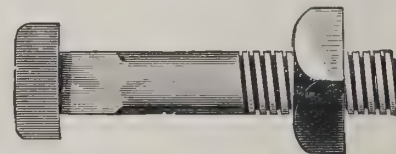
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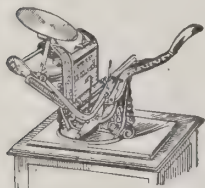
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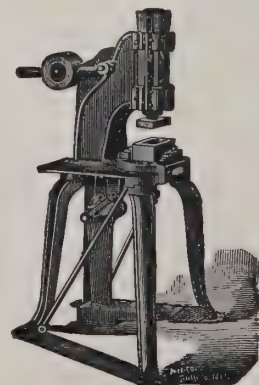
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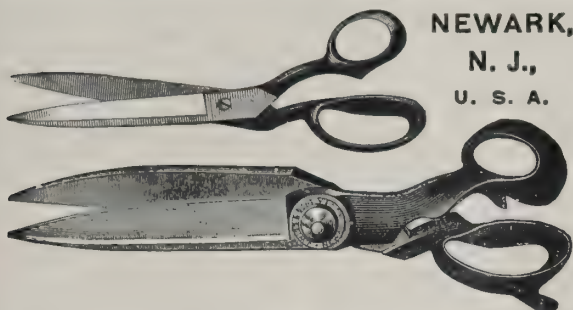
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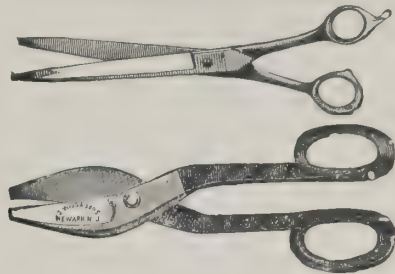
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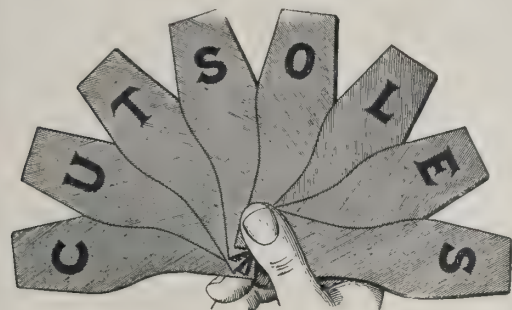


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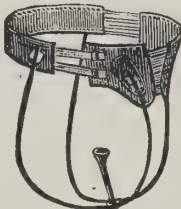
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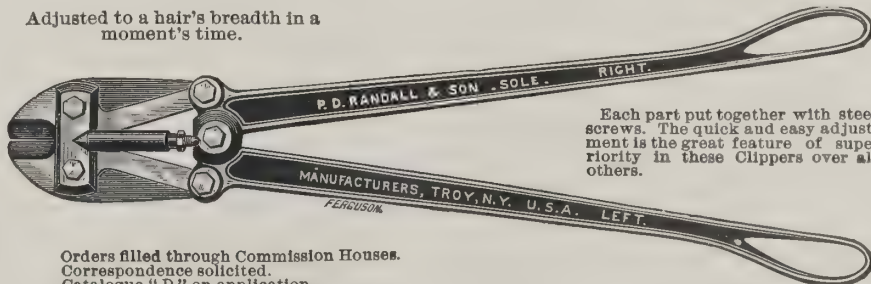
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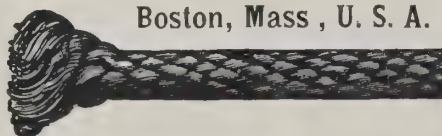
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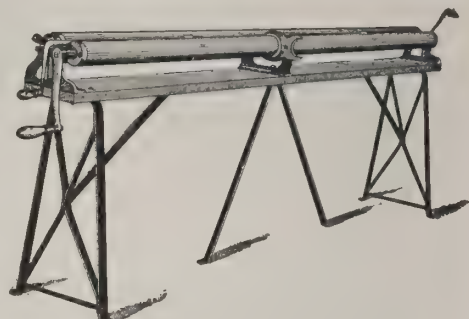
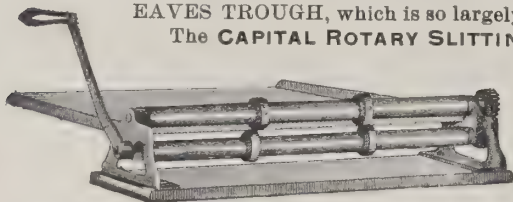
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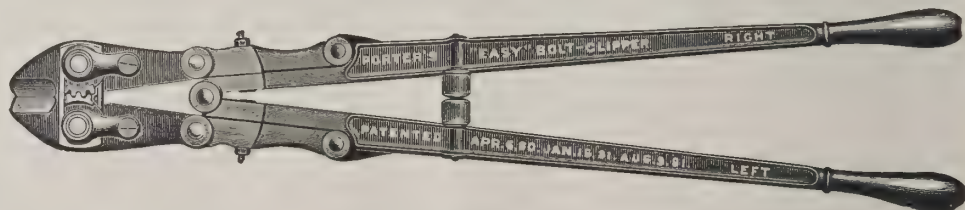
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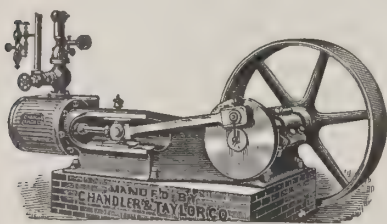
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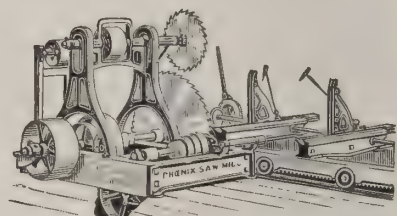
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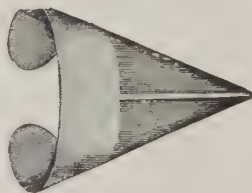


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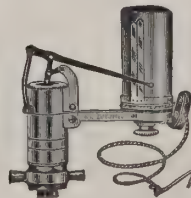
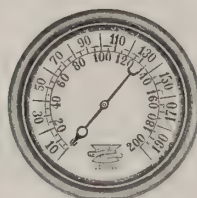
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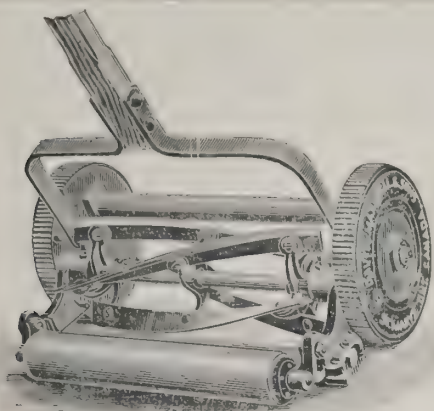
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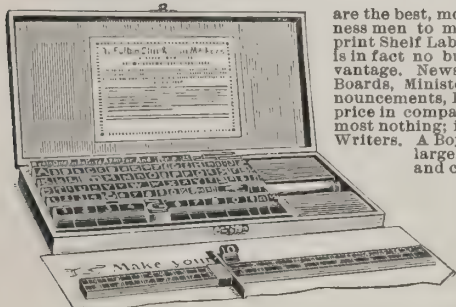


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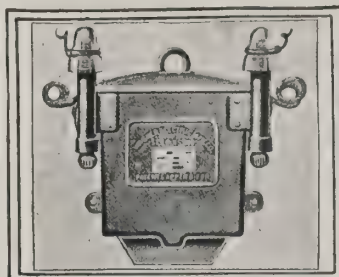


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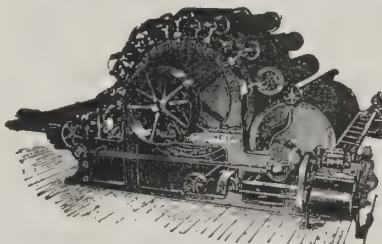


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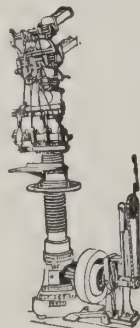
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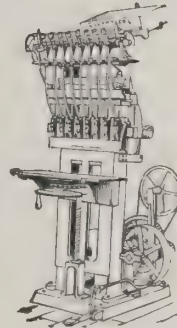
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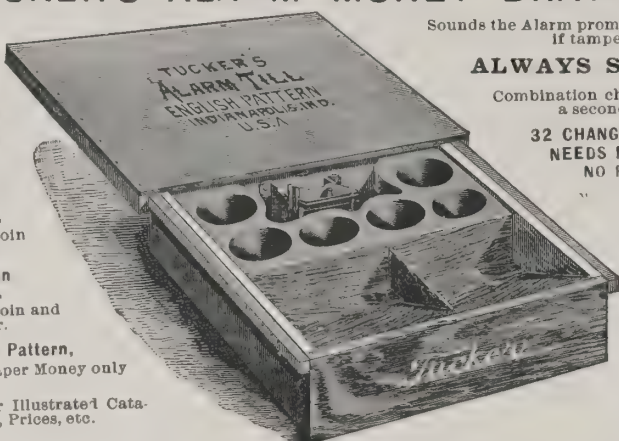
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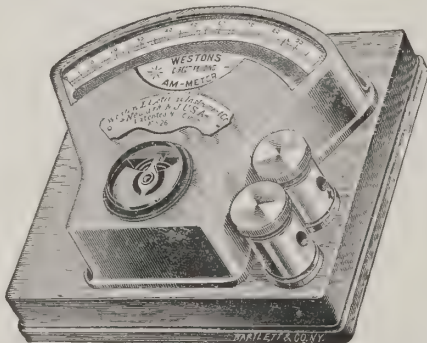
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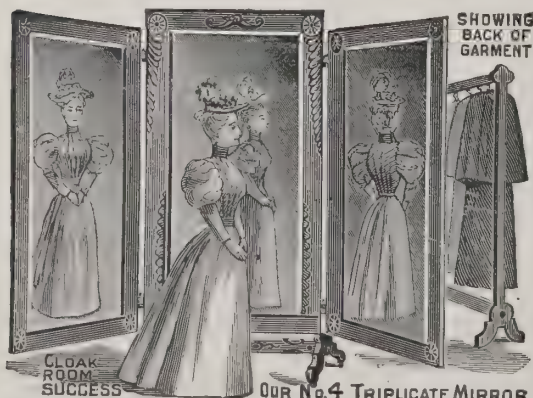
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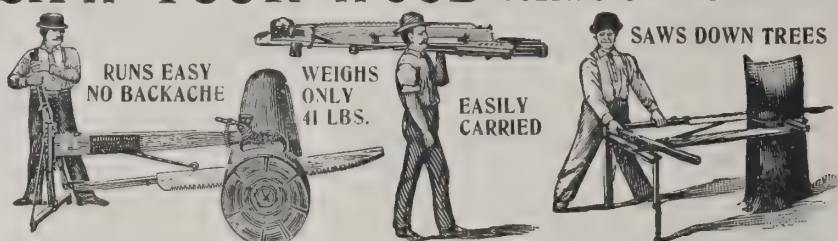
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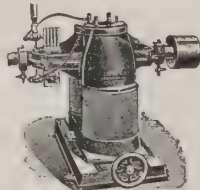


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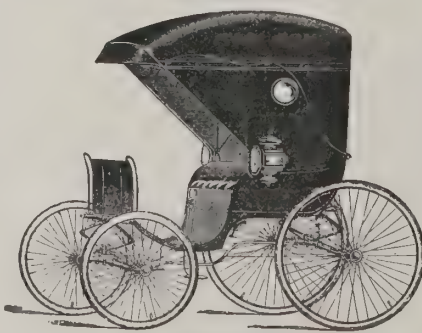
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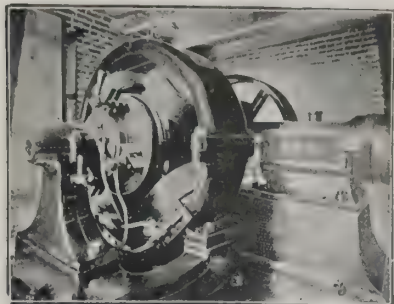


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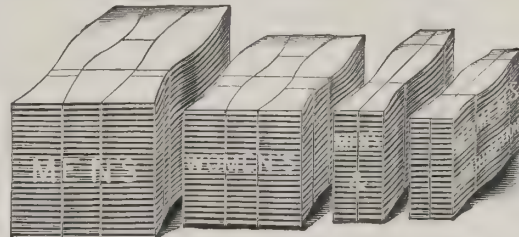
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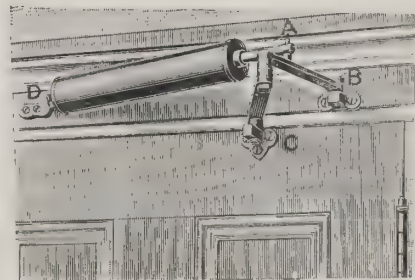
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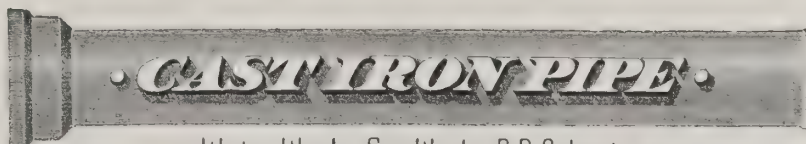
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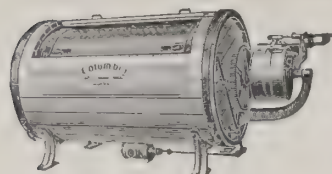
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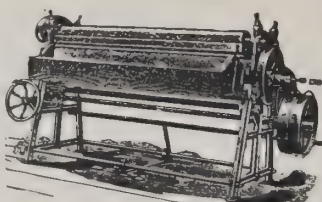
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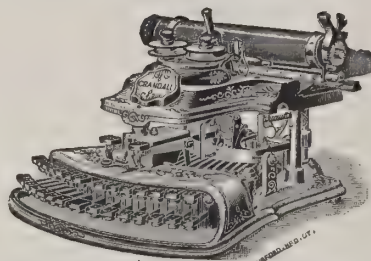
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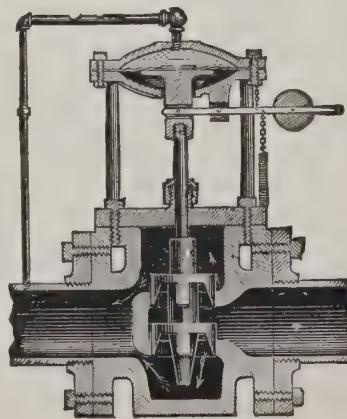
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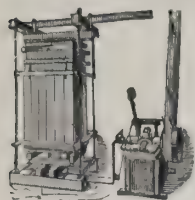
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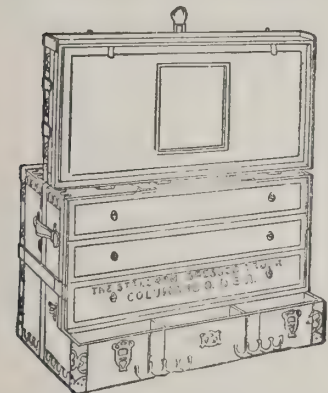
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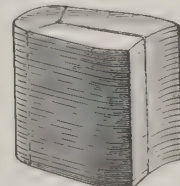
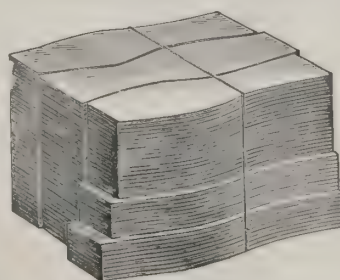
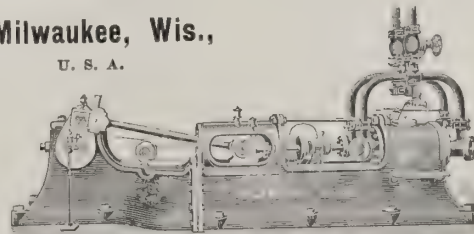
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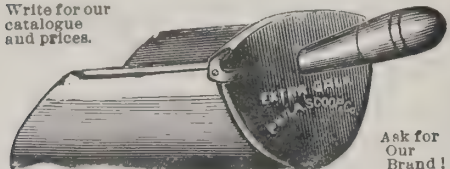
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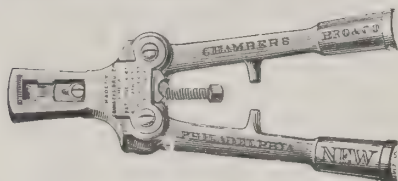
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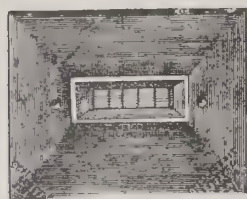
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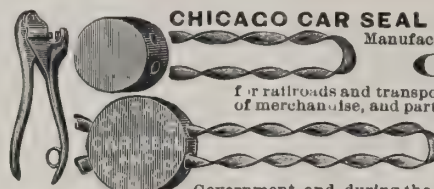
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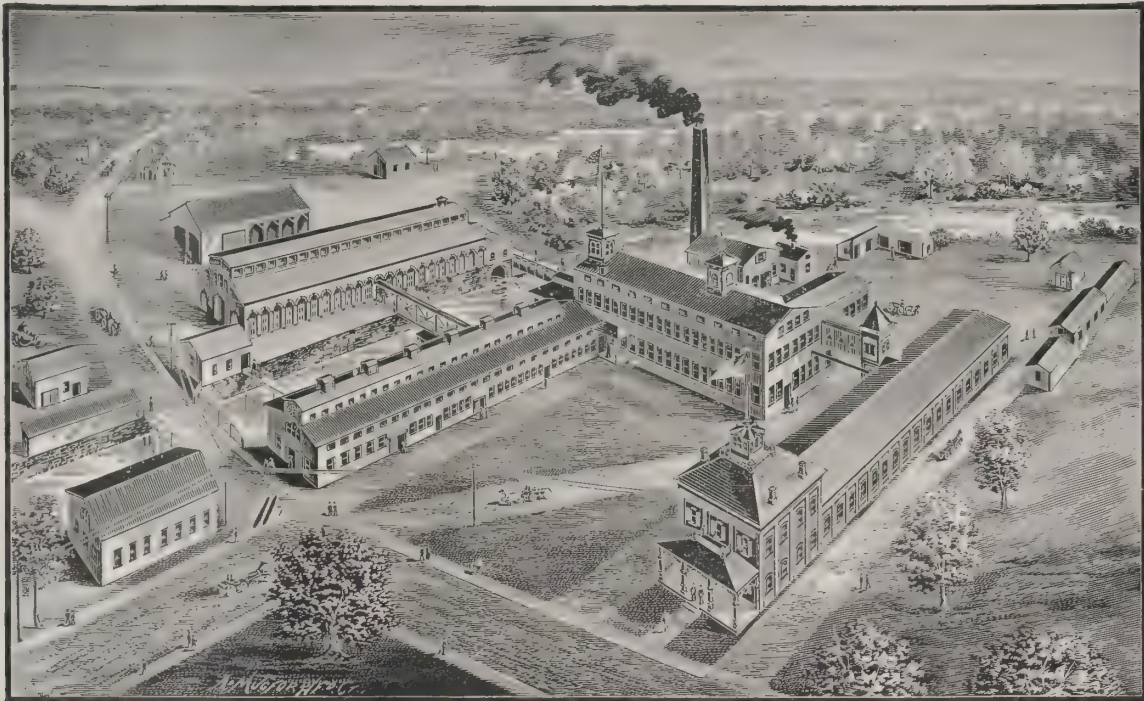


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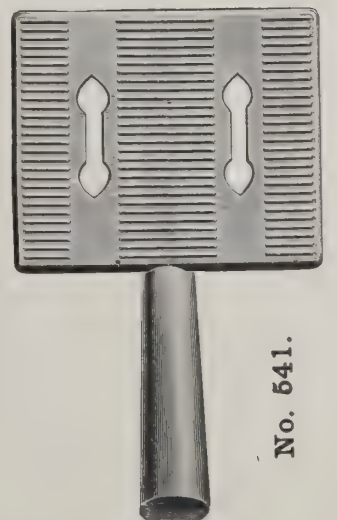
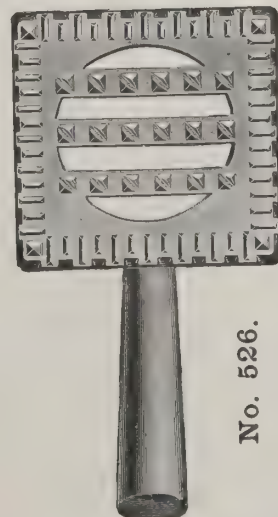
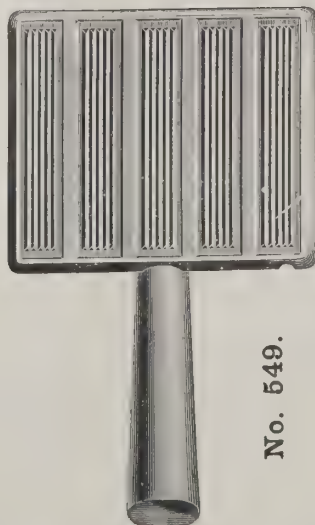
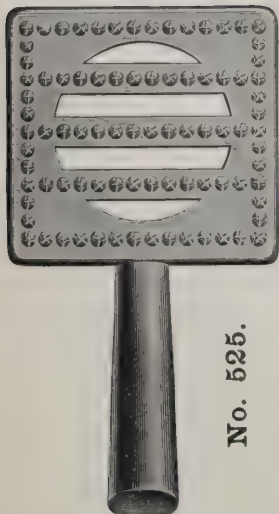
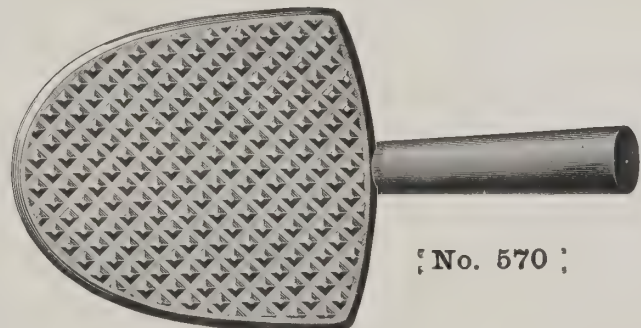
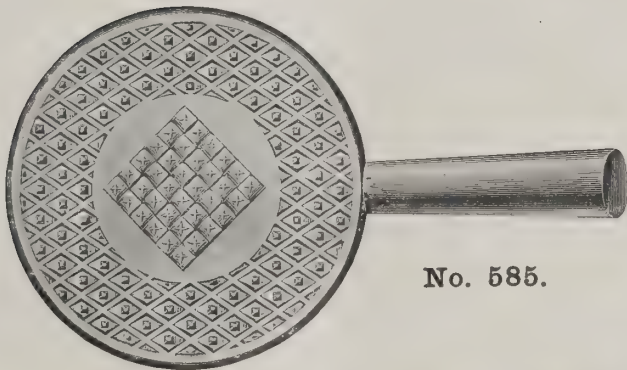
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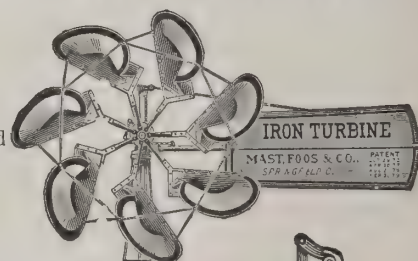
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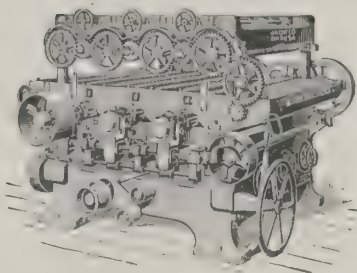
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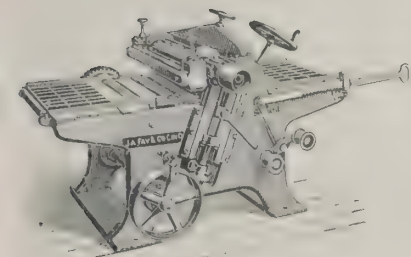
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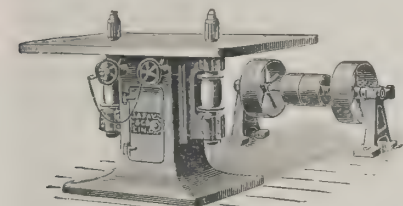
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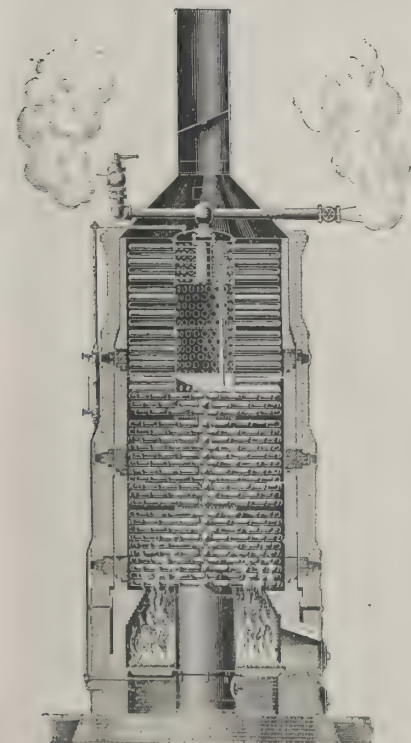


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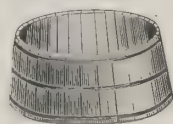
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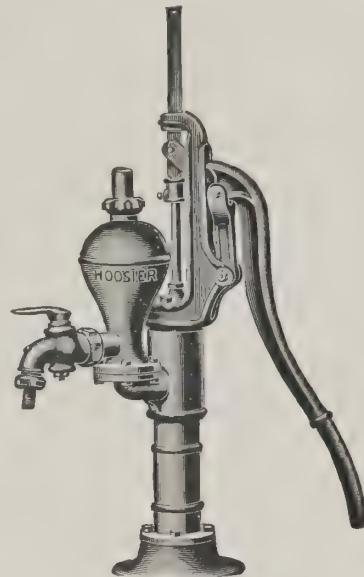
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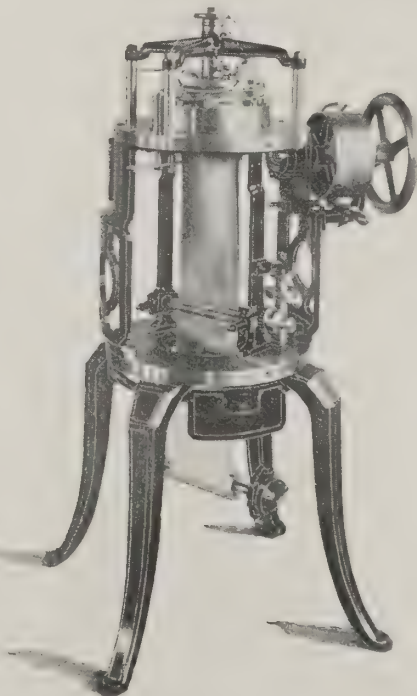
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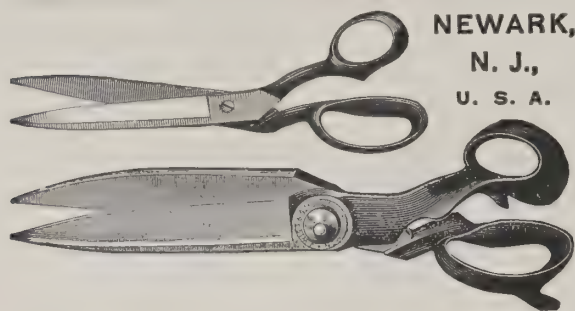
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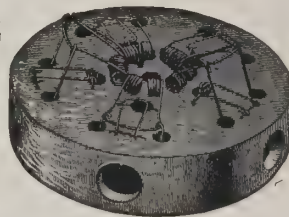
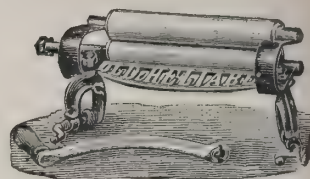
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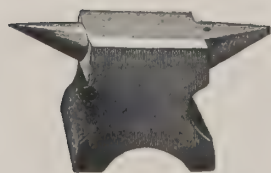
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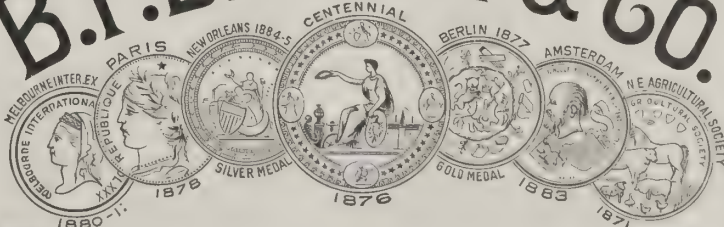
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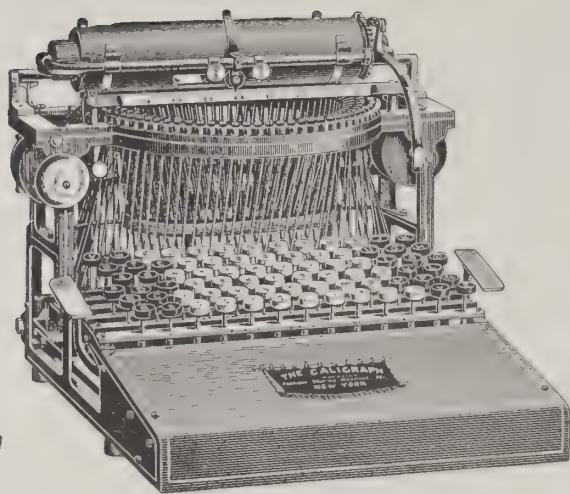




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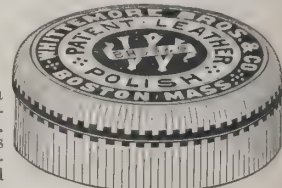
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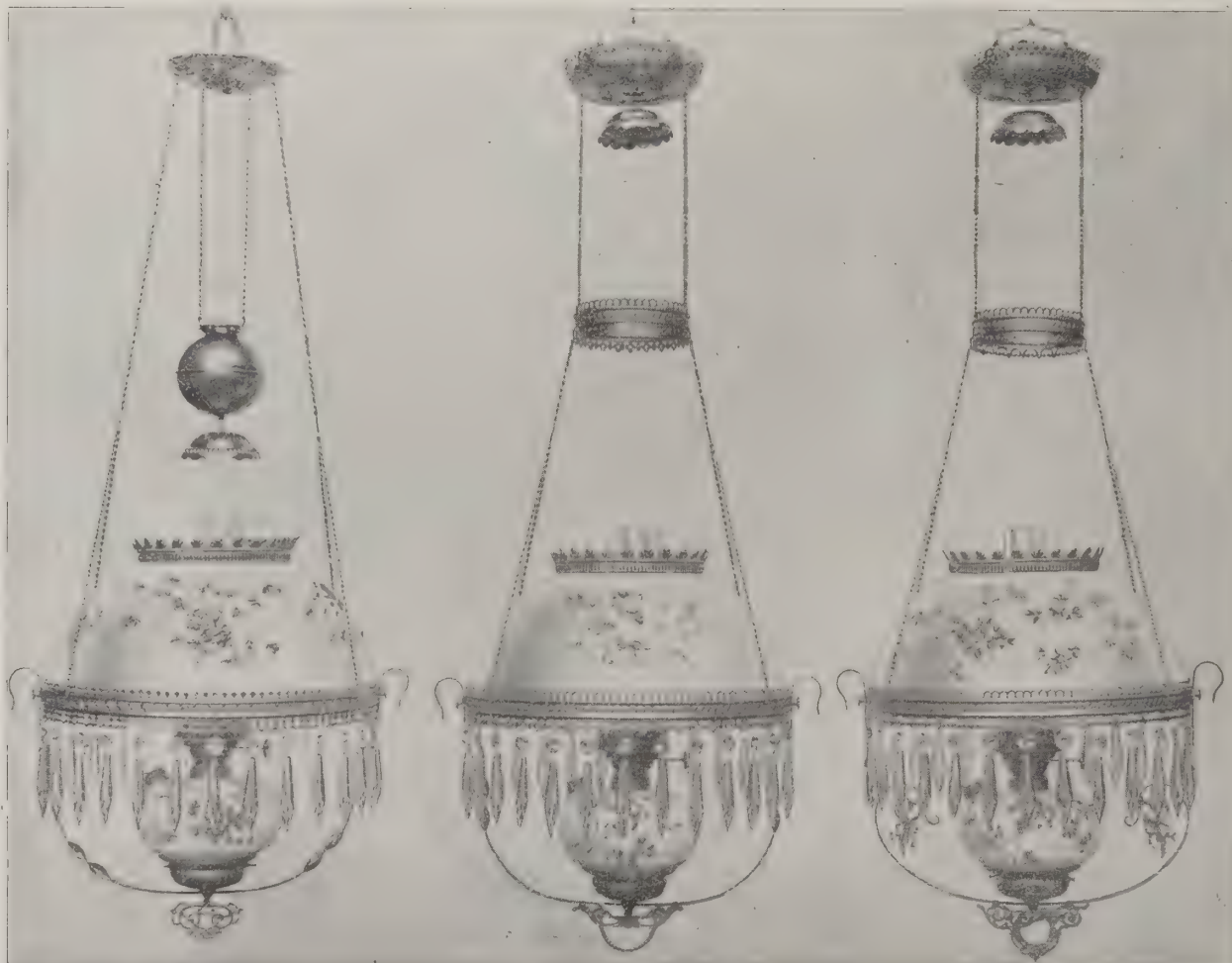
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THE AMERICAN EXPORTER was established in 1877 for the express purpose of developing a foreign demand for American manufactures, by calling the attention of the leading foreign importers and consumers to the unrivaled facilities in this country for supplying their wants.

Its policy, as then announced, has never been changed.

It is published monthly, in separate English and Spanish editions, and is dispatched direct by mail to the leading buyers of foreign goods in every country outside of the United States.

It is absolutely free and independent of any and all other existing export agencies. Its mission is to originate trade, and not to execute orders, which is properly the function of the commission merchant.

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**MILITARISM—1897—COMMERCE.**

A SURVEY of the world's commercial outlook at the beginning of 1897 does not justify the expectation that the pursuit of industrial and commercial vocations, all of which make for peace when not diverted to the uses of war, will be wholly undisturbed during the year by unnatural causes. The fact that all great industrial and commercial nations are carrying heavy burdens for the maintenance of their military and naval establishments and that the pressure is ever in the direction of increase proves that civilization has not reached a degree of development at which international justice can be guaranteed by courts having international jurisdiction in the manner in which justice for individuals is guaranteed by civil courts. So long as nations feel the necessity of depending upon the physical force represented by their army and navy as a means of securing justice from other nations rather than the enforcement of justice by consensus of international opinion, armies and navies must be maintained, and the increase made in the fighting strength of one nation must be met by a similar increase by other nations, or a group of nations that can depend upon one another's co-operation in the event of war with a greater power.

Commerce has derived many advantages from the achievements of armed force. They are, in essential characteristics, the advantages gained by settlers representing the habits, customs and ideas of civilized life who drive barbarous tribes out of the country they occupy. This is done by armed force. Masters of such force are the first rulers of border life. As such communities become established governments they pass from military to civil rule. With the development of civil government there come courts of civil justice, which afford protection for life and property by making such protection a function of government rather than of the individual. In States so constituted crimes against life and property are matters of social concern, the punishment of which is assumed by society, to the great relief of individuals, and especially the weaker members of society. This relief, and the increased security gained by the institution of governments through which it is obtained, gives direct encouragement and impetus to all peaceful vocations. The advantages derived by industry and commerce from the conquests and protection achieved by armed force serve to carry progress over the transition period from barbarism to civilization. It is incapable of going beyond this limit and safeguarding social interests to the highest development of civilization. Before this can be reached all interests must be safeguarded by a widespread recognition of the principles of justice, and their enforcement must be ordered by international courts of justice, to which such power will be delegated by the family of nations corresponding with the delegation of such power to the civil courts by the individuals and families composing a community or State.

This transition from militarism to industrialism is gaining cumulative force in every quarter of the world. Much is said about the increase of militarism, but this increase, in comparison with the increase of the industrial and commercial interests of any State, is a rapidly diminishing factor. Industry and commerce demand peace. They demand the application of the surplus energy they create to the processes of production and distribution rather than to the processes of destruction and unproductive consumption inseparable from the maintenance and operation of armed force. The vast magnitude of industrial and commercial interests and the manner in which these interests are universally affected by the conduct of any nation are fast forcing militarism into a secondary position as protector, not the ruler, of national destiny. Countries now ground down by military taxation—most keenly felt in the ranks of labor—are learning how to estimate the relief that will come to them from a bona fide determination to abide by international arbitration. Militarism, with its excessive demands on the brain and muscle of Europe, once abolished by this means, will set labor free to cultivate hitherto neglected districts, the capital for which will be abundantly supplied by diverting military expenditures to the uses of industry. It is calculated, if permitted to develop in a natural order, keeping the peace unbroken for a quarter of a cen-

tury, avoiding draining the country of its labor and resources by foreign expeditions, thus rendering unnecessary any increase of taxation, that Italy will become prosperous. Coined money will be restored to circulation, credit will be restored and the "Golden Age" will return. The institution of similar conditions will induce corresponding results for every country. Herein is the guarantee of the peace of the world.

Governments are instituted to establish justice and promote prosperity. Those governments that establish sound financial conditions and use their powers to maintain peace as fundamental conditions for inducing prosperity will win the confidence of their people and the world and will become leaders in industry and commerce, as they may have been leaders in armed force. In this direction international competition for supremacy will move the progress of the world.

The only danger to the peace of the world is found in the enormous powers liable to be called into use by the hot-headed action of a few persons, who may commit their governments to a declaration of war which others would be compelled to resent. This is the place where those whose interests are identified with the pursuits of peace must exercise the conservative force of their restraining influence. The method of doing this will depend upon the instrumentalities by means of which the people of each country can most effectually direct governmental or executive action. In the United States consensus of opinion, widely and clearly expressed, can easily gain sufficient force to control the action of law-makers and executive. The people of the United States want peace with all nations and will do their full duty in seeing that their Government is not at fault in observing every international requirement that will tend to make peace certain. Sending this greeting to those in every nation whose interests are involved in the welfare of industry and commerce, we ask that they, in their own way, restrain the combatitiveness of those educated to the profession of arms and those who can order their movements, and thus make the year 1897 a year of peace. If militarism can be held stationary for this year commerce will advance to a position of controlling and overmastering power throughout the world. One year of universal peace will make an enormous gain for the industrial and commercial prosperity of all mankind.

**INTERNATIONAL TRADE.**

THE freer the distribution of products becomes the more accurate is the knowledge of the characters, habits and customs; the laws, government and judicial procedures; the natural resources, climates, soils and conditions of production that nations acquire regarding each other. Telegraphic communication and rapid transit for mails and commodities make the conditions of markets, the needs of all localities, and the visible supply in relation to the possible demand, matters of daily information. Machine-using countries cannot dispose of all their products in their domestic markets and are making an urgent search for customers who will buy their commodities in sufficient quantities to permit them to operate their plants at their full capacity without stoppage. The rapidity with which industrial movements are now developed and spread over the world is causing many readjustments in conditions in the world's markets. The new is continually displacing the old in rapid succession, and those who fail rightly to comprehend the course of events and linger too long in the ways of their fathers are made to suffer positive want and hardship. The labor-performing machine pushes aside the manual laborer and leaves him without bread, unless he makes himself master of the machine or finds a new way of using his energy. But, in the long run, every improvement in the utility or efficiency of labor-performing machinery multiplies the opportunities and increases the compensation of labor, just as heavily loaded freight trains and steamships, superseding freight wagons and sailing vessels, have enormously increased the demand for commodities by their widespread and low-cost distribution.

There are differences in natural resources, aptitudes, race energy, enterprise and customs which will ever stimulate the currents



of commerce. Only those can compete who are producers of similar commodities under conditions that may become equivalent. As no nation can monopolize the natural materials and the processes of manufacture for the production of any commodity sufficiently useful to be in demand in the world's markets, the world's trade is not only an exchange of finished commodities ready for consumption, but is also an exchange of machinery and tools by means of which natural materials are prepared for consumption. This results in establishing equivalent conditions in all competing nations and ever tends to a world-wide equalization of market standards and prices. In this way economic forces, overmastering all national legislation and public policy, are speeding forward the grand movements of international trade to its undiscovered destiny.

Viewed in its broadest sense, international trade is but an expansion of the interchange of individual services. Every person performs service that is of no value to himself only as it has a value to others, and for this reason enables him to buy what he wants from them. Men work all their lives in producing things they never use, only as a means of obtaining things they desire to use. The more they secure of the things they want in exchange for the things they do not want the more comforts they enjoy, the more they find life worth living, the greater their wealth becomes. Overlooking the imaginary boundaries of nations, world-wide trade is an exchange of unlike commodities between those who produce them, and world-wide competition is a strife between those who produce like commodities to secure in exchange for them the unlike commodities produced by others. The instinct of self-preservation is a reserve force back of the instinct of acquisition. Every one strikes out to acquire something more for himself. When driven back by the superior intelligence or resourceful powers met with in the world's markets, his aggressive policy is concentrated into a defensive policy. He gives his attention to protecting his home market, knowing full well that the forces which defeat him in the open markets of the world will follow him to his home and compete with him there for the trade of his next-door neighbor. Whatever the factor of inferiority may be that causes failure to command trade in the world's markets, it will be a cause of weakness in retaining trade in home markets. Those who succeed in any market are those who keep pace with the best machinery, tools and designs for intended use, and are most wise and far-sighted in their methods for causing consumers of their products throughout the world to understand that they can supply the best goods at advantageous prices.

#### A BRITISH VIEW OF AMERICAN RIVALRY.

THE *Colliery Guardian*, an English publication, recently advised its readers as follows:

"America's coal production for 1895 was 5 per cent. above the largest ever recorded in the history of the American coal trade, and 13 per cent. above that of 1894. We rejoice in our rival's success, which is due largely, no doubt, to the natural growth of the trade wants of a youthful and vigorous community, and accept it as a challenge to renewed activity and enterprise on our part.

"America is looking forward to being a competitor with European countries for the world's markets, but at present this expectation is scarcely realized, as is seen from the fact that of the whole of the lately greatly augmented production of her manufactures she requires a great part for home use. Of this we have an illustration in the fact, ascertained by a contemporary, that for every dollar she receives from her customers abroad she obtains seventy-five from those at home, so that at present she needs the greater part of her manufactured goods for herself. We must expect rivalry in future, no doubt, but let it be generous rivalry, where each seeks the advantage not by depreciating its rival's efforts, but by increasing its own."

We like the tone of this, but we do not like the practical illustration given in the same paragraph, where it is stated that the manufactured exports of the United States are but \$135,000,000, while the exports of Great Britain are \$900,000,000. We will not say that the figures given for the United States are not correct, for they

may be so for some year way back, but the year is not given. We will say that since the manufactured exports of the United States were \$250,000,000, it is slightly "depreciating" to have the figures for a way-back year published now.

The exports of the United States for 1896 were \$907,617,647. If the *Colliery Guardian* is correct in saying that for every dollar received from customers abroad our producers receive seventy-five from customers at home, their domestic sales must amount to the enormous sum of over \$67,500,000,000.

The overflow of such an output when the rising tide of production bursts over the national boundaries with full force will quickly deluge all Europe. Well may the *Guardian* congratulate its readers on the fact that "at present" the United States needs the greater part of its production for home consumption. If it did not the deluge would be spreading over the face of Europe now.

#### AMERICAN SHOE MACHINERY IN EUROPE.

MANUFACTURERS in other countries accustomed to the services of local artisans and local machinery and methods cannot realize the disadvantages American-made machines and tools suffer from being placed for use in the hands of persons unaccustomed to them. All American machinery has been retarded in adoption by this cause in every country to which it has been sent, but that requiring most intelligence and skill to enable it to yield the best results has naturally been at the greatest disadvantage. This fact has been well illustrated in the experience of shoe machinery. The possibilities of various machines have been honestly represented to the foreign manufacturer, but when he has imported the machine and tried to produce in his own shop the results represented as being the usual American experience he has not been able to realize his expectations. An investigation always developed the fact that the difference in results between American and foreign factories was due to the difference in the intelligence, skill and good will with which the machines were operated. Low-priced labor invariably proves to be unintelligent and unskillful, and such workmen are opposed to the adoption of labor-performing machinery. These facts are now being understood by progressive foreign manufacturers. They are studying the situation closely, both practically and theoretically. They are subscribing for American trade papers and educating their workmen, and the workmen, finding they can command better pay when able to operate machines intelligently and skillfully, are looking upon the adoption of machinery with more favor. As a result of the combined influence of these several causes the world's markets are rapidly opening for the sale of American shoe machinery. Foreign manufacturers who attempt to win trade by making imitations of American machines find themselves unable to make sales at American prices. Buyers recognize the fact that a considerable difference in the first cost of a machine is no compensation for a doubt as to its reliability in performance, and willingly pay a higher price for a genuine American-made machine.

This preference for American-made products communicates itself to all items of shoe manufacturing. American blackings, dressings and prepared stock are preferred by those who have learned the advantages of American machines and manufacturing methods. The impetus now gained gives promise of a large demand for 1897.

#### LEAD.

WHEN it is known that the production of lead in the United States for 1896 was 20,863 tons greater than for 1895 the conclusion may be drawn that a lead famine is not one of the possibilities for this country. This metal enters into so many uses it is present in almost every metal manufacturing establishment. American manufacturers are most fortunate in having at their command a practically limitless supply of all kinds of metals produced in their own country. This is an advantage that will tell in their favor with increasing force as the commerce of the world increases and the facilities of exchange make the world grow smaller, causing all mankind to be neighbors.



## FOREIGN TRADE OF THE UNITED STATES FOR 1896.

WHEN the Treasury Bureau of Statistics has completed its work for the year 1896 the exhibit made of the foreign trade of the United States will be satisfactory. The data already compiled show that the exports and imports are in excess of those for 1895 and 1894, and that the completed returns may bring the figures close up to the high water-mark of 1892, when the exports and imports amounted to \$1,857,680,610. The exports and imports for 1896 will not be far from \$1,625,000,000. The exports are estimated at \$932,616,439 and the imports at \$687,066,716, showing an excess of exports of more than \$245,000,000. This is a greater balance of trade than has been secured since 1881, when the balance was nearly \$260,000,000, and is not far behind the greatest year, that of 1879, when the foreign trade balance in favor of the United States was \$264,661,666.

In the estimates made for the year 1896 the items of exports are grouped as follows:

Agriculture .....	\$589,598,662
Manufactures .....	249,943,541
Mining .....	21,494,002
Forestry .....	36,350,760
Fisheries .....	6,332,308
Miscellaneous .....	3,898,374
Total .....	\$907,617,647

For the fiscal year ending June 30, 1896, the exports of manufactures were \$228,000,000, being an increase of \$44,000,000 over the previous year and carrying figures above any previous record. The character and distribution of this export trade may be briefly given.

Agricultural implements, mowers, reapers, plows and cultivators, about \$500,000 to each of the countries of the United Kingdom, Germany and France, and \$1,000,000 to all other countries in Europe.

Books, maps, engravings and other printed matter, \$700,000 to the United Kingdom, about \$500,000 to British North America and \$180,000 to war-destroyed Cuba.

Carriages, cars and street cars, \$500,000 to the United Kingdom, \$500,000 to Mexico, \$250,000 to British Australasia and \$350,000 to Africa.

Copper ingots and bars, \$20,000,000 to Europe, of which about \$10,000,000 went to countries outside of the United Kingdom, Germany and France. This was an enormous increase compared with the years 1894-95.

Cotton cloths, \$2,000,000 to British North America, \$600,000 to Brazil, \$5,000,000 to China, while the exports to the United Kingdom, Central American States, British Honduras and other West Indian ports were increased. For other cotton goods British North America was the best single customer, taking about \$1,200,000 of such goods.

Builders' hardware, more than \$1,000,000 to the United Kingdom, \$425,000 to Germany, \$600,000 to Mexico, \$760,000 to British Australasia and \$500,000 to British North America.

Sewing machines, \$810,000 to the United Kingdom and \$200,000 to British Australasia.

Other machinery, \$4,000,000 to the United Kingdom, \$4,000,000 to Europe outside of the United Kingdom, Germany and France and \$1,500,000 to Africa.

Sole leather, \$5,000,000 to the United Kingdom and also \$7,000,000 of other kinds of leather, \$500,000 of finished leather to British North America.

Lumber, \$2,500,000 to the United Kingdom, \$380,000 to Germany, \$600,000 to British North America (although that country is full of lumber), \$600,000 to the West Indies, \$1,000,000 to Argentina, \$800,000 to Brazil, \$500,000 to British Australasia and \$550,000 to Africa. These figures do not include exportations of shingles, shooks and staves, of which a large amount were sent to many countries, nor household furniture, of which there was exported more than \$3,000,000, and other manufactures of wood,

amounting in all to about \$32,000,000 for wood, manufactured and unmanufactured.

Bicycles make the most remarkable showing in view of the fact that prior to June 30, 1895, the exports of bicycles had been so small that it was found unnecessary to separate their classification in the returns. For the year 1896 the exportations amounted to upwards of \$3,000,000. Of this amount \$1,200,000 went to the United Kingdom, \$220,000 to Germany, \$120,000 to France, more than \$400,000 to the rest of Europe, more than \$515,000 to British North America, \$350,000 to British Australasia, \$35,000 to Africa and \$5,000 to Cuba.

This export trade for American manufactures has been gained by the production of superior work, the acceptance of suggestions made from time to time by American consular officers and the application of enterprise in the cultivation of foreign markets, one evidence of which is exhibited in the advertising pages of *THE AMERICAN EXPORTER*. We feel proud of the showing now made and offer American manufacturers our services for 1897 to assist in making their products known in the world's markets. We confidently assert that in no other way can the expenditure of the same amount of money go so far and bring back as good returns. Advertisements in *THE AMERICAN EXPORTER* and *EL EXPORTADOR AMERICANO* sow the seed, by making the products advertised known, from which springs a demand in all of the world's markets.

## COPPER.

SOME fifteen years ago a gentleman remarked he was glad to see any new use for copper, because he owned stock in a mine and there was so much ore he was afraid it would have no value by the time it was taken out. The advent of the industrial use of electricity must have fully satisfied his desire. Already the demand for copper for electrical uses is enormously large, but calculating ten years ahead on the basis of the experience of ten years just past it is seen that the demand of to-day is still close to a minimum. It is not unlikely that in a few more years the earth will be searched almost as closely for copper as for gold. That this search is being vigorously pushed in the United States is shown by the fact that the production of copper in this country for 1896 was 67,270,000 pounds greater than for 1895.

Consumers of copper can look with confidence to America for a practically inexhaustible supply. The economics of production and the richness of the numerous deposits if stimulated by only a slight increase in price would cause an enormous output. One thing that serves to keep the price of copper down is the increasing value found in by-products secured by improved methods in treating the ores. The possibilities in this direction are far from being exhausted.

## GOLD PRODUCTION IN THE UNITED STATES.

THE financiers of the world may look for a greater raise in values in the near future than followed the discovery of gold in California sixty years ago. Instead of becoming exhausted the possibilities of gold production in the United States are only now beginning to be realized.

The gold production of the United States for 1896 was \$57,000,000, which is 26 per cent. of the product for the entire world, and is \$10,000,000 greater than for 1895. An increase of 20 per cent. in one year shows that causes are at work which will rapidly develop a larger output than has been previously thought possible. This fact will be better understood when it is considered that the increase does not come very largely from new discoveries, but from improved machinery and methods in work in old mines or mines that have been thought too poor to be worked profitably.

American mining machinery is sought after from every quarter of the world. American mining engineers, methods and machinery have had no small part in the developments made in South Africa. Some of these engineers have recently returned and declare that many American mines can be made to pay better than a majority



of those in South Africa. The impetus given to mining operations by the profits that have become possible through the use of improved machinery and methods, and the aid of electric power and electrical processes, is certain to enormously increase the production of gold, not only in the United States, but throughout the world. It is no exaggeration to say that there is more gold "in sight" in the United States to-day than the entire world's production in 1896. The ores and "pay dirt" now discovered will yield much more than this when fully worked. This fact is something for gold-standard advocates to think about.

#### MORE AMERICAN LOCOMOTIVES FOR JAPAN.

THE commercial instinct is very strong in the Japanese. Some of the railroads in that country are owned by the government. Recently the government invited proposals for supplying locomotives from three of the best builders in the United States. After a careful investigation of the tenders made, a contract for eighteen locomotives was awarded to the Rogers Locomotive Company, of Providence, R. I. These comprise both freight and passenger engines of about 50 tons weight and 3 feet 6 inches gauge, which is the standard in the Empire.

The Nippon Railway Company of Japan, a private company, has recently ordered forty locomotives from the Baldwin Locomotive Works of Philadelphia.

These facts show that the Japanese effort to imitate foreign-made locomotives and secure the advantage of the so called cheap labor of that country is not yet completely successful. Nor will it ever be. As we have pointed out elsewhere, an imitator can never be the equal of an originator, and when the Japanese are capable of originating, or of doing as much good work within a given time as American workmen, they will command American wages and will in fact be what they are now pleased to call themselves in name—the Yankees of the Orient.

#### JAMES KIRK.

IT is improbable that many readers of THE AMERICAN EXPORTER will have a previous knowledge of this man, or be able to form an idea why his name should be given prominence by heading an article. What this man did, which now entitles him to special mention, was a simple matter now being done daily by hundreds of men in all parts of the world without attracting attention from any one, yet the thing he did, at the time he did it, marks an era in the world's history which will grow in importance as long as a knowledge of the present civilization abides in the records and minds of men. The whole story is told in this simple telegraphic announcement:

"PIQUA, O., U. S. A., Jan. 6, 1897.—James Kirk, who, in 1844, strung the first telegraph line in the world, between Baltimore and Washington, has been stricken with paralysis and is in a critical condition at his home in this city."

What mind can conceive the changes wrought from that day in 1844 to this, the world over, by the electrical transmission of intelligence? The importance of the event is great enough to render all who had to do with it immortal. In thinking of the recent past, the active present and the possible future, one newspaper writer has well said:

"Almost abreast of desire, progress which once lagged far in the wake of the world's ambition, having donned the ten-league boots of modern opportunity, in these new times is advancing by long leaps and breathless strides. So it is that events and inventions which thirty years ago would have started a thrill around the world are now viewed by the moving multitude of humanity as matter-of-course results of a greater and, forsooth, a faster age. To surprise an up-to-date business man one's wares must be novel indeed; to make him stare you must hypnotize him with a miracle."

What miracle of old is equal to that initiated by the work of James Kirk in 1844?

#### ALABAMA IRON.

THE growth of the export trade in Alabama pig iron has been surprisingly rapid. In 1895 400 tons of Alabama iron were sent to Europe for experimental purposes. Those familiar with iron working will understand how cautiously it is necessary to move in the adoption of iron from a new source. How much time and care is required for manipulation and tests under varying conditions before ironworkers can feel sure they fully understand all the qualities and possibilities of a new product. It is therefore no cause of surprise to the trade that during the first three months of 1896 but a few hundred tons of Alabama iron were exported to Europe. But these sample lots have proven fruitful. European ironmasters have found the iron satisfactory so far as tested. While it is doubtful whether or not they yet fully understand all its possibilities, evidence is not wanting to show that they have found this American iron cheaper and better than the output of European mines.

From July 1 to December 31, 1896, two companies shipped 75,000 tons. It is estimated that shipments made by smaller concerns run the total exports for that six months up to 100,000 tons. The trade did not begin in real earnest until November, 1896. Since that time it has gone forward with a rush and is now regarded as permanently established. One company booked orders for 10,000 tons the first week in January, 1897, while another company has orders for 37,400 to be filled. At this rate the trade for 1897 will be the most remarkable record of the growth of an export demand for an American product that has ever been written.

When European ironworkers take Alabama iron with such avidity iron consumers in all countries will know where they can secure the cheapest good quality iron in the world.

#### A Field for Manufactures.

THE last issue of *Harper's Weekly* draws attention to an excellent field for American manufactures which might be cultivated with very profitable results. Reference is made to South Africa, where English manufacturers and merchants are very energetically developing their trade with good results, and where American merchants would find a profitable field for enterprise if they took the same steps to develop trade interest there. The writer in *Harper's Weekly* says:

"Africans have need of American wagons, American plows, American harness, American labor-saving machinery of every kind, boots and shoes, furniture, to say nothing of canned provisions. I mention only a few of the articles of American manufacture which occurred to me particularly on my last trip there. The nature of South African life is so identical with many parts of our Western country that American goods are preferred to English when they can be got; but, unfortunately for Americans, the English are always ahead in one respect at least. Great Britain is represented throughout the world by a highly educated and well-trained set of commercial agents, whose business it is to encourage trade between the mother country and the outside world. There is no good reason why the United States should not be equally well represented for such purposes, particularly in countries where American trade is struggling for a fair recognition. In South Africa we should have a Consul-General at the Cape of Good Hope, with a salary of not less than \$15,000 a year. Under him should be consuls at Johannesburg, Bloemfontein, Durban, Port Elizabeth, Delagoa Bay—each of whom should have a salary not less than \$10,000 a year. In each of these towns the United States should build a consulate worthy of its name, so that our representatives should not be forced to seek temporary shelter in lodging-houses.

THE first American house of importance to accept the invitation given last Summer by Li Hung Chang to the manufacturers of this country to send their representatives to China to show their goods is the Winchester Repeating Arms Company, of New Haven, Conn. Henry Brewer, one of the company's representatives, will immediately start for China to exhibit the model 1895, or, as it is commonly known, the Winchester Army Rifle and the Lee Straight Pull Rifle, adopted for the navy by the United States Government. The Winchester people are at present making 10,000 of these rifles for the Government. During his stay in China Mr. Brewer will exhibit these rifles to the government officials and viceroys.

—Shipping to South American ports is fast increasing. This month alone there have been booked to sail for different ports of Argentine Republic six steamers and five sailing vessels. The regular monthly schedule is three steamers and seldom over four sailing vessels.

—Cyrus T. Thatcher, of Momence, Ill., claims to have discovered a process of manufacturing a lubricating oil of a superior quality, which is entirely non-combustible. A year's use, he says, has demonstrated its superiority over other oils as a lubricator.



### American Coal for Export.

THE following article from the New York *Evening Post* as to the prospects and possibilities of American coal being sold at a profit in European countries will interest foreign importers, especially those who may have the enterprise and initiative to make the experiment suggested.

The producing capacity of the anthracite coal mines of Pennsylvania is estimated at about twice the consumption of the country. Moreover, the use of the product has reached the maximum, and any further expansion beyond a natural increase year by year in proportion to the growth of population seems improbable. Production that has proved excessive when measured by the demand has of late years kept down the price of coal. This in turn has rendered it difficult, says the New York *Evening Post*, to meet interest on a bonded indebtedness created when the industry was new and prices of coal were high.

The inability to expand or to derive sufficient revenues from coal sold has induced various capitalists connected with the industry to investigate at different times the subject of developing the foreign markets. This field is comparatively untouched, as is shown by export returns. Last year the United States exported 3,682,893 tons of coal. Of this amount 1,470,710 tons were anthracite. Of the total 3,601,431 tons went to British North America, and of the remainder only 1,511 tons went to European countries. The European field has thus far proved inaccessible because of economic conditions. One of the earlier attempts to establish a market there was made by the late President Gowen of the Philadelphia and Reading. This official had the benefit of experience derived in some previous efforts by the same company. He undertook the matter on an extensive scale.

Coal, stoves, a locomotive and a number of agents were sent to the continent. The trial was fair, and was given up as impracticable, owing to the social and economic forces encountered. At the time coal was much higher in the home market and the demand greater in proportion to the supply than at present. This may have had something to do with the cessation of attempts as noted. The Philadelphia and Reading road made the last practical experiment, although there have been a number of investigations since then. About a year ago H. Baring, who had studied the question while in Germany, called the attention of the Anthracite Coal Operators' Association to the matter, and this body appointed a commission, consisting of John C. Haddock, of Haddock, Shonk & Co.; Alfred Walters, president of Coxe Bros. & Co., Limited, and F. T. Patterson, to look into the matter. This body rendered a report unfavorable to the project. Mr. Haddock recently said that the existence of Welsh anthracite in competitive markets, in commercial quantities, practically closed these markets to American producers, because of the comparatively low prices at which it sold, as well as the social customs of consumers. The form of stoves, the economical manner of purchasing fuel and the form in which it is used must, he says, of necessity be overcome before a market commercially important can be developed for American anthracite. This, in his opinion, would virtually amount to a social revolution.

The next contribution to the literature on the subject was made by Henry S. Fleming, assistant secretary of the Anthracite Coal Operators' Association, in a paper which he recently read before that body at a meeting at the Waldorf. This article is particularly exhaustive, and furnishes the most definite data on the subject that are in existence to-day. Practically, every question that has a bearing upon the consumption, supply and cost of fuel in continental markets is gone into thoroughly, with a view of determining just what chance and on what lines the American product could compete. An abstract of the more salient points of the article follows:

Coal enters Austria, Belgium, Germany, Italy, Netherlands, Norway, Sweden and Great Britain free of entry. In Denmark the duty is 17.87 cents per ton; in France 23.10 cents, and in Spain 58 cents. In 1895 Germany mined 79,163,615 tons of coal, and 24,713,198 tons of lignite. It imported 5,117,456 tons of coal and 7,181,050 tons of lignite, and exported 10,360,838 tons of coal, showing its consumption to have been 73,920,133 tons of coal and 31,894,248 tons of lignite. Belgium produced in 1894, 20,534,501 tons, imported 1,200,000 tons, and exported 4,800,000 tons. France produced 27,000,000 tons and imported 11,000,000 tons. Great Britain produced 191,289,965 tons and exported 33,641,447 tons. Russia produces 6,000,000 tons annually and imports 2,000,000 tons, and Italy produces 317,249 tons of lignite and imports 3,725,000 tons of coal.

Great Britain, France, Germany and Russia produce anthracite. The first named is the only country which has the true article in any quantity. In 1895 from its mines in Wales, Scotland and Ireland it produced 1,759,939 tons. The proportion exported is not known, as it is not itemized separately from soft-coal exports. While in Germany all dry coal is classed as anthracite, the only coal found which would be considered free-burning anthracite in this country is that produced in Osnabrück, where the output is little more than one-third of a million tons per annum. In the last-named region the cost of mining, including taxes, insurance, interest, etc., is \$1.66 per ton. The figure is steadily increasing owing to the deepening of the mines. In Welsh anthracite the volatile matter ranges from 2.81 to 12 per cent., and the fixed carbon from 81 to 95.69 per cent. The German coal shows volatile matter running from 8.4 to 13.11 per cent., and fixed carbon from 74.81 to 89.58 per cent. The Pennsylvania Lehigh contains 5.28 per cent. of volatile matter and 89.15 per cent. of fixed carbon. The free-burning Pennsylvania coals are lower in volatile matter and somewhat higher in fixed carbon. From this it is concluded that the foreign anthracite burns more readily than the domestic, while its heating properties are not quite as great.

On the continent fuel is purchased even by the people of means in small quantities. A "centner" (110 pounds) is the usual measure. For domestic use briquettes made from peat lignite, fine coal or coke dust, or a combination of those ingredients, are largely employed because of the relatively low cost, free-

dom from smoke and slow-burning character. In England there is rapidly coming into general use a semi coke which is a product of a process conducted with a view of saving and utilizing the tar, ammonia and gas by-products of the coal. The profit derived on these enables the sale of the coke at a comparatively low figure.

A hitherto serious obstacle to the introduction of American coal into Germany has been the fact that stoves in use there were not applicable. This is in a fair way to be overcome, as American stoves, especially of the base burner type, are being manufactured in quantities in German foundries.

The article contains many valuable data concerning prices at various points, of freights between points of origin and consumption, and freights from American to European points. These data are comprehensively summed up in the concluding paragraphs of the articles as follows:

The figures which have been presented show that the average in Hamburg and other leading ports is from \$4.50 to \$5. The highest was at Lübeck, a small port, where \$5.40 is named. A safe average will be about \$5.10. The lowest freight rate named was \$2.24 per ton, to which must be added loading charges of 25 cents and insurance, about 10 cents, making the cost delivered \$2.59. This rate cannot be secured now, as freights have advanced nearly 80 per cent., but might possibly be obtained during the Summer months. This is assuming that the consignee pays port, unloading and lighter charges, which would amount to nearly 50 cents a ton. On this basis the size called for by most of the German dealers,  $\frac{3}{4}$  to  $1\frac{3}{4}$  equal to our nut and the greater part of the stove sizes, would cost, tidewater price and ocean freight, \$6.59 on vessel at the German port, or nearly \$2 more than it could be sold for. The only favorable feature in the correspondence is that some dealers specify a size of .59 to .98 inch, equal to our pea and part of the nut coal. This sells in Berlin for \$5 per ton, and at a few other points appears to bring nearly the same price as the larger size, 1.56 to .98 inch. Even if the present size of pea coal was accepted at the average price given, it would cost delivered, tidewater price, \$2.10, and ocean freight, about \$4.70, leaving a very small margin to cover the risks of the trade. The proposition to establish a large agency and handle direct to the retailers is hardly practicable, as, while the price received would be from one to two dollars more, there would be unloading, storage and handling expenses, besides agents' commissions, to come out of it.

Apparently the only practicable plan by which the European market can be reached will be by an arrangement of through freights from the coal breakers to the port of delivery, and if any action is taken it should be first with the railroads to secure an understanding as to this. If this could be arranged, then a careful canvass of the German, French and Italian markets to settle on the size would be required, and selection of agents there who might act under the direction of a general agent in this country. On such a basis it might be possible to build up a fair trade for some of the smaller sizes of coal, but this or another plan will require a large outlay of money, extending possibly over a considerable period, before any substantial returns can be expected.

### The Wooden Lath Doomed.

ONE industry which is declining in this country is the manufacture of wooden laths, says an Eastern daily. It is not owing to any general decrease of building, nor to business depression, but to the growing demand from nearly all architects for metallic lathing in the construction of the partitions of modern buildings. Metallic lathing is used less with a view to making the buildings fireproof than to making the walls and partitions stronger and less likely to crack. Ordinary wooden laths are nailed to the studdings while still green or wet from exposure to the weather. It would make no difference if they were perfectly dry, for the mortar would quickly moisten them. Then comes the drying-out process. As the laths dry they twist and turn, cracking the mortar and weakening the wall. The wooden lath is apparently doomed except for the construction of the cheapest kind of buildings. The advantages of any form of metal laths are so great that architects have no difficulty in persuading prospective builders to use them to the exclusion of wood.

The metal lath was first made of thin sheet iron strips, ribbed or having the edges turned over to give strength. Perforated sheet iron with ragged punctures, in which the mortar would clinch, succeeded the strips; and wire-netting lathing was introduced. It was generally strengthened with ribs of coarser wire and is still extensively used, not only for partitions, but for concrete floors as well.

Within a few years scores of patents have been granted for metallic lathing, and in almost every instance they have been for making sheet steel plates provided with slits or perforations to hold the mortar. Several varieties are designed to get more surface out of the metal sheet than by mere perforating and are known as expanded metal lathing. One company has had almost a monopoly of expanding metal in this manner by the use of an ingenious machine upon which it has patents here and abroad. The sales run up to considerably more than \$1,000,000 a year in the United States, it is said.

—The city of Sydney, Australia, is about to adopt electricity as the motive power for its street-railway system, and it is said that the necessary material and appliances will be obtained from the United States.

—Englishmen are becoming convinced that they can learn something from the American shipbuilders' art from the fact of their sending two of the ablest representatives of that craft over here to look us over in this special respect. American methods indicate leadership beyond all other nations in the ship-building line, and this preëminence is observable in all kinds of naval constructions, from the harbor yacht to the man-of-war. The slow-going nations of the world may yet realize the substantiality of American notions.



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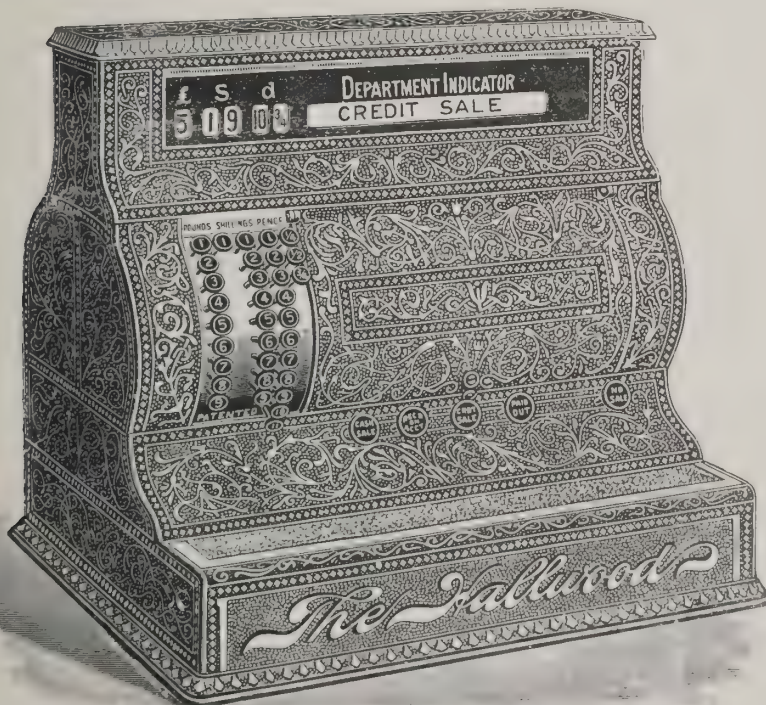
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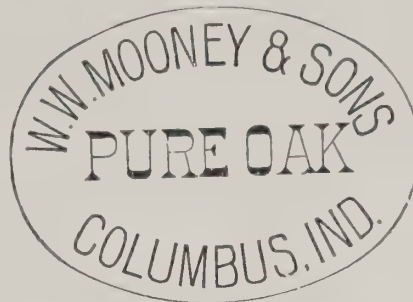
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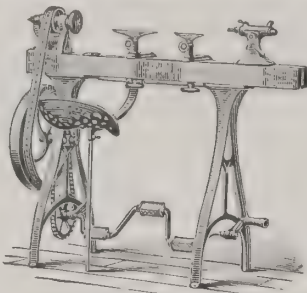
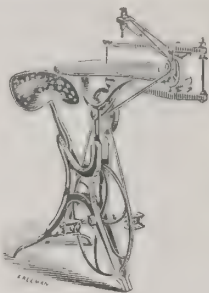
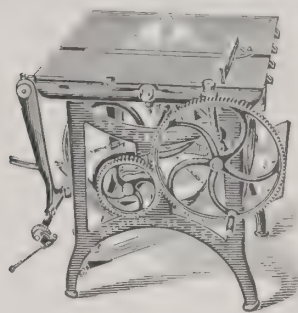
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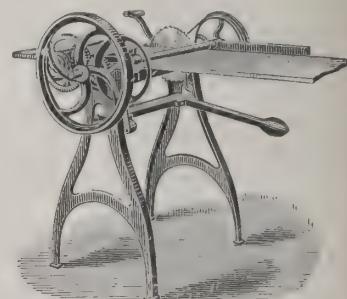
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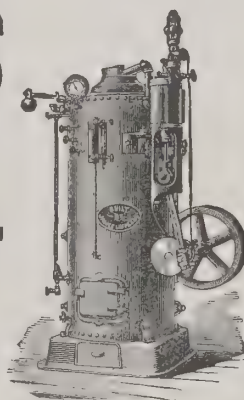
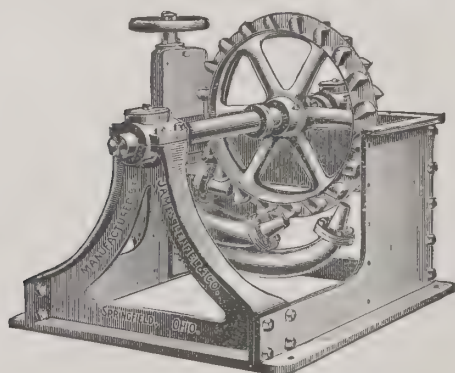
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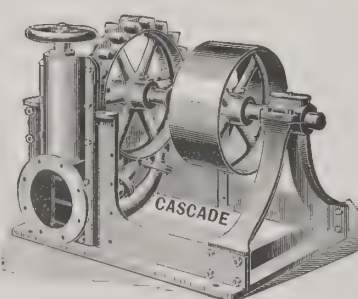
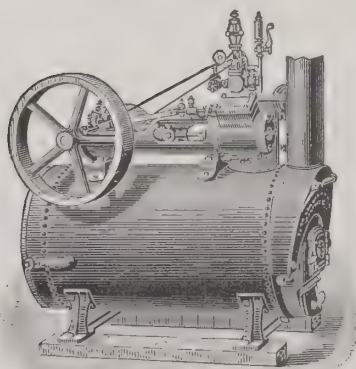
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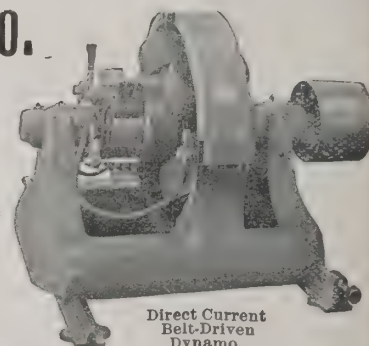
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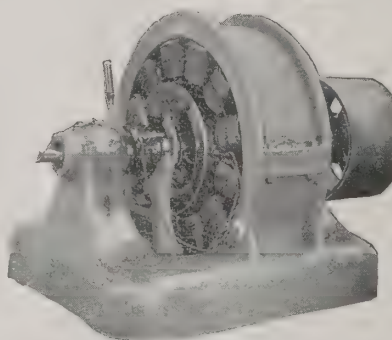
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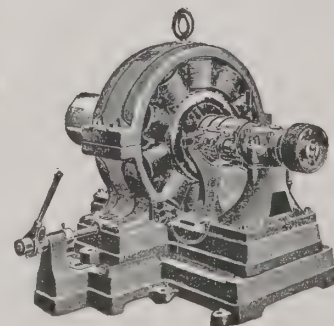
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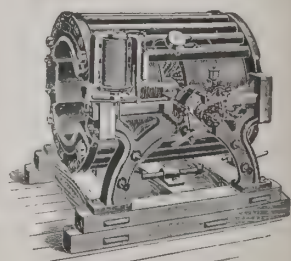
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DEVOTED TO THE FOREIGN TRADE IN MACHINERY AND HARDWARE.

### Pittsburg to Rule the Steel Markets of the World.

THE *Pittsburg Times* of January 4th makes this announcement upon the grounds of the contracts recently made by the Carnegie Steel Company, Ltd., with the owners of the Mountain Iron and Rathbun Mines, on the Messabi Mountain range, Minnesota. Pittsburg, it says, is now in a position to dominate the steel markets of the world for many years, if not for all time to come. Just why and how this is made certain is a long story, and requires a brief recital of the principal events connected with the development of iron and steel manufacture in the United States.

It is generally recognized that the Carnegie Steel Company, Ltd., has been the leading concern in the country for years, although there are other firms whose operations are extensive. The other firms, however, are more confined to special branches of manufacture, some of them patented specialties which give them exclusive trade. The Carnegie Company, Ltd., operates in the general production of steel rails, steel beams for bridges and buildings, steel billets, blooms, boiler and ship plates, wire rod, armor plate and materials for special purposes. Its annual output of pig iron is the greatest of any concern in the world, reaching to almost 1,000,000 tons in 1891, and its capacity now is greater by 750,000 tons than at that time. In addition to the seven furnaces at Bessemer, it operates the two Lucy furnaces on the Allegheny River, and has built two of the largest-capacity furnaces known at Duquesne, and intends building two more of the same size.

It formerly purchased in the open market for consumption between 600,000 and 700,000 tons of pig iron from other producers. It will hereafter make all the pig iron it consumes. A narrative of some of the most important facts connected with the advantages possessed by the company is interesting at this time, when so much is being said and done in connection with its most recent steps in development, and particularly when its extension of operations means so much for the future of Pittsburg and her commerce, and without disparagement of the many other firms whose extensive operations and enterprise are doing for Pittsburg what the business men of no other community are doing on so large a scale.

The discovery of the power of steam and the invention of the steam engine were two of the most important achievements of mankind. These two agencies have done more, perhaps, for the upbuilding of nations, the multiplication of human comforts and the civilization of the race than all other influences of human origin. They have created the enormous demand for iron and steel, and take a prominent part in their production. It was natural, therefore, that when the forefathers found iron ore cropping out all over the Appalachian mountain range they should turn attention to the making of iron, especially as iron brought from England was high in cost and not always obtainable. Iron furnaces were established in various parts of Virginia, Pennsylvania and New York, the wooded lands giving charcoal as a convenient and cheap fuel for its smelting. Under primitive methods of smelting ores, with no railroads to make rapid and regular transit of the product to the points of consumption, the business developed slowly but gradually. From the deposits of great beds of rich ores in the Allegheny mountain ranges the developments naturally were confined to the States in which such deposits were found.

A feature which obtrudes itself in studying the development of the iron and steel industry is the order of and timeliness of the succession of the discoveries of new deposits of raw materials and the invention and perfection of new methods of manipulation. During the period of the Civil War the enormous demand for iron gave an impetus to the industry which promoted development. It was during this period that the demand for steel was developed to the degree which gave a premium to enterprising men to engage in its manufacture. Endeavors to make steel by means of a blast which would add oxygen to the molten metal and burn out the carbon had been made at Johnstown by William Kelly as early as 1854-55. Henry Bessemer worked along the same lines in England, and invented a method of making steel by means very similar in 1856, since which time the product has been known as Bessemer steel. Daniel J. Morell and his associates in the Cambria Iron Company were the first men in the United States to experiment with the Bessemer process, but soon after Andrew and Thomas M. Carnegie, Henry Phipps, and a few other men, then owners of the Union Iron Mills, Pittsburg, began the erection of a plant at Braddock's Fields for the manufacture of railway rails. They obtained a right to use the Bessemer patents and spent enormous sums in a vain endeavor to make a success of the process. At the time Alexander Holley, one of the honored names in the history of American mechanical engineering, was employed at the works, and after many

failures he succeeded in perfecting the blowing process to a degree which made it commercially practicable. From that time on the history of the developments in iron and steel manufacture frequently mentions the names of this notable group of men.

The Bessemer process required that pig iron should be made out of ores having certain properties. In prospecting for deposits of copper in the Lake Superior region large quantities of such ores were found in that section during the 50's by explorers, but were too remote from the places of manufacture to be utilized in steelmaking, and the absence of fuel made it impracticable to make steel near where the ores are found. This caused Americans who knew of the existence of iron ore deposits in Cuba to make closer inquiry concerning them, and the Pennsylvania Steel Company made purchases which insured to it a supply of ores from Cuba, at a small cost for transportation to Baltimore, and thence by rail to the works at Steelton, then known as Lochiel, so named in compliment to Gen. Simon Cameron. The presence of ore and the absence of fuel to make use of it in the Lake Superior region, and the presence of fuel and the absence of Bessemer ore in the vicinity of Pittsburg, presented an economic question which the practical qualities of mind possessed by the men connected with the Edgar Thomson Steel Works suggested study. Pittsburg was making iron in its higher forms, but only a small amount of pig iron. Until the discovery of the superior excellence of the coal of the Connellsville Basin for coke-making had been demonstrated no blast furnace in Pittsburg used coke for fuel. It was not until 1861 that coke was successfully used, and during that year, largely under the patience and energy of William Lyon, of the firm of Lyon, Shorb & Co., owners in part of the Clinton furnace, Connellsville coke was demonstrated to be a practical success as a blast-furnace fuel.

Little was done in the Connellsville Basin in developing the coking industry at that time. There were a few coking ovens scattered through the region, chiefly in Fayette County, near Connellsville, and the coke was brought to Pittsburg by river in light-draught boats. In 1871 H. C. Frick engaged in the making of coke, and since that time his name has been associated with the industry as closely as Andrew Carnegie's is with the steel industry. In 1882 Andrew and Thomas M. Carnegie, Henry Phipps and H. C. Frick joined in business interests, and the remarkable development of the coke and steel interests in which they are associated is attributable to the interesting personalities these men present, each having qualities worthy of study, and each characterized by an enterprising spirit, an unconquerable will and a foresightedness which is only equalled by the patience with which they work for the accomplishment of the ends which they plan far ahead, and which they make all possible effort to achieve by directing their business policies to the attainment of the desired end.

In the manufacture of steel this group of men lead the world; in the manufacture of coke the same men are the world's leaders and exemplars in enterprise and in the adaptation of business to the economic development of the age. Having the largest tonnage capacity for making steel, having the largest tonnage capacity for making coke; recognizing that in the development of economics, the closer the producer can get to the actual consumer, without having to market his products through intermediate hands, the larger will be the market because of the lower profit-making price, and the smaller cost on the unit of production because of the larger output, these men began to direct effort for the accomplishment of an aim which has been successfully consummated which makes them to-day the masters of the steel and coke industries of the world, and at the same time enthrones Pittsburg as the greatest manufacturing city of the universe for probably centuries to come.

In an interview which was freely commented on at the time Andrew Carnegie said some years ago that Chicago was destined to be the leader in iron and steel production on the American continent. The reason given was that by reason of the low cost of ores from the Superior region to the lake shore at Chicago, and the constant tendency to reduce the cost of fuel by means of better knowledge of economy in its utilization, Pittsburg must reconcile herself to the idea of passing the crown to another and younger competitor for the honor of being the supreme dictator of the markets in iron and steel products. About the same time an agitation was started against the railways by manufacturers of Pennsylvania, who charged that the roads, which owe their lives as corporations to the State and the prosperity they have enjoyed to her iron and steel masters and coal producers, were discriminating against citizens of the State in favor of the residents of other States. Mr. Carnegie made an address to the Legislature which was full of startling statements, and urged that legislation be enacted to compel the railways of the State to deal justly with her manufacturers, who are their best customers. The agitation was of little effect on rail



rates, but it has been continued with more or less acerbity ever since. It was one of the inspiring causes of the scheme to cut a canal through from the lake to the Ohio River, and gave added interest and energy to the business men of Pittsburg and vicinity to bring influence to bear on Congress for the improvement of the Ohio and its tributary streams.

The ship canal did not commend itself to the business sense of Mr. Carnegie. He thought it possible, but scarcely practicable. He thought it would require assistance from the State or Nation and could not be held from the clutches of the railways if they saw fit to buy its stock. Instead he began to figure on the cost of carrying freight on railways. He estimated the tonnage which a road could, by reasonable rates, obtain between the lakes and Pittsburg. He figured the expense of carrying freight to a fraction of a cent per ton per mile. Then he began to study the geography of the country between Lake Erie and the Ohio River; then between the Monongahela River and the lake, along the line of the shortest and quickest means of bridging the distance. A railway line was decided on as the most practicable. He then studied the nature of the country along the short-line route; the extent and quality of its deposits of coal; the nature, extent and degree of prosperity enjoyed by the manufacturers along such a line, and what the possibility of multiplying manufacturing establishments along such a route were. The results of these inquiries were satisfactory. He found coal, stone and various valuable clays in large quantities; manufacturing advantages not surpassed by any territory on the continent, good location for distributing products East, West, South and North by means of rail or river. Then he began to work. Men were employed to survey the route of a proposed line to connect with the Pittsburg, Shenango and Lake Erie Railroad, in which he had bought large interests in recent years in anticipation of future plans. A company was chartered under the name of the Pittsburg and Butler Railway Company, he being the heaviest stock subscriber. Contracts were let for the grading of the route and the building of the bridges. Later the stockholders of the Pittsburg, Shenango and Lake Erie agreed to merge their own and the proposed new line into one company, and to change the name to the Pittsburg, Bessemer and Lake Erie. The same men own a large frontage on the lake at Conneaut harbor, and have docks which are being improved to accommodate the large business in handling ores and coal which it is expected to handle there. Contracts have been placed for machinery to handle ore and coal by the carload. The coal cars will be run upon a dumping machine clamped so they will remain in a fixed position, and then by the application of power the car will be turned over on its side and the coal will run down a chute into the hold of the vessel. It is reckoned that it will take less than two minutes to unload a car. One will be loaded almost as quickly. Large scoops will gather up the ore from the hold of the ship and elevate it to the car height and dump it in at the rate of several tons at a time. It is expected to load a car with ore in less than five minutes.

The ore will be produced at the mines recently acquired by the Oliver Mining Company on the Messabi mountain range, in which company the Carnegie Steel Company bought an interest about a year ago as a result of a trip of exploration made by H. C. Frick, H. M. Curry, Lawrence C. Phipps, John Walker, H. W. Oliver and George T. Oliver. This deal is attributed to the persistent rumors that the Rockefeller interest have been contemplating the erection of a mammoth steel plant at the lake side, and with the enormous capital at their disposal, their interests in coal lands and coke plants in the Connellsville region, their large consumptive capacity through their oil-producing, piping, refining and distributing agencies and steamships, they would not only take out of the general market one of the largest buying interests, but become powerful enough to dominate the markets of the country.

The consolidation of interests between the Carnegies and H. C. Frick in 1892 gave to the company all the advantages of a cheap and unfailing fuel supply, and attention was directed to the acquisition of equal advantages in supplies of ore, limestone, manganese and other raw materials. Then began negotiations for the leasehold of the Mountain Iron and Rathbun ore mines on the Messabi range, Minnesota, the most extensive ore deposits known in the world, and where the costs of production are so small as compared with other deposits that great advantages are obtained. The ores from these mines, which were opened in 1892, are known to be rich in iron, but it was not known that they could be used successfully for making Bessemer steel, although classified as Bessemer ores. The Carnegie Steel Company, Ltd., demonstrated this fact to its own satisfaction at the new blast furnace plant at Duquesne during last year, and with the knowledge kept strictly secret by its officers, and unknown to the owners of the mines, the negotiations were renewed with ardor. After weeks of negotiation the leasehold was secured and the whole scheme unfolded. By the terms of the lease the Bessemer Steamship Company, owned almost entirely by the Rockefeller interests, obtains the ore-carrying trade from the Messabi region to Conneaut harbor, where it will be transferred to the cars of the Pittsburg, Bessemer and Lake Erie road and brought to Bessemer, Duquesne and Homestead. From the ore mines to the furnaces the line of transportation is complete, and the line has already been christened the "Bessemer Route."

The richness of the ores of the two mines is said not to be excelled in iron except by the ores found at one place on the Atlantic seaboard, and the analyses made show iron to the amount of not less than 60 per cent., and as high as 64 per cent., while the amount of phosphorus is less than .045 in some grades, and not in excess of .052 in any case. They can be used as well in basic and ordinary open hearth steelmaking with like success, although requiring other ores for mixture, as in making Bessemer steel. The same company owns manganese mines in Virginia, Georgia and Cuba; limestone quarries in Indiana County, fire-clay deposits in the Connellsville region, coal lands and natural gas wells in various counties, and combines all the economies which necessarily follow the operation of its great business by producing at first hands all the raw

materials which enter into its manufactures, having no profits to pay the middle men, and having a tonnage capacity so large that the fixed expense of its organization is spread so widely over a vast volume of business operations which reduces the cost of the unit of production to so small a figure that no other company in the world can manufacture at so low a cost.

It is stated by reputed authorities that the cost of mining ores at these mines on the Messabi range does not exceed 10 cents a ton. The surface of the earth is "skimmed" off, and the ore is scooped up with steam shovels, three to five tons at a time, and loaded into cars, whence it is hauled to the docks and transferred to the ships of the Bessemer line. The rate for transporting it to the Conneaut docks is said to have been below the usual rate, which has averaged 50 cents a ton. From Conneaut to the furnace at Bessemer and Duquesne the rate is said to have been fixed at 45 cents a ton, which, adding cost of mining and freight charges from mines to furnaces, plus 25 cents royalty, the cost of ore does not exceed \$1.60 a ton. With coke secured in the Connellsville region under equally favorable circumstances, the cost of fuel is relatively low, and so with limestone and other raw materials. The cost of transforming these materials into pig iron, thence by the direct process into billets, is computed by experienced men not to exceed in cost \$11.50 per ton at the mill. From these figures, which are only approximate, it will be seen that no company in the world can manufacture so cheaply, and none can have greater advantages. It proclaims to the world that in future Pittsburg will dominate the steel markets for long years to come, and this fact can be relied upon to bring to the district over which Pittsburg sways immediate influence in manufacture and commerce enterprises which will diversify the manufactured products of the region and multiply employments; build towns until they reach into and absorb each other, and make those who own property feel secure that it will not depreciate in value, while those engaged in trade and traffic have an assurance of plenty of business if they but apply to its direction that knowledge and enterprise which competition demands, and which the new economic forces of the time are more and more requiring business men to observe and be guided by.

While always alive to advantage in securing materials of manufacture the company is also among the first to adopt new devices, methods and machinery for the multiplication of production or the lessening of cost of manufacture. Much as other firms have done in the line of developing steel manufacture and in adopting new methods and machinery to lessen costs, the enormous expense attached to dismantling a rolling mill, tearing down a furnace and replacing it has never deterred the men who manage the great institution which is known and feared by rivals in Europe, and which only concerns having large capital and enormous production can safely attempt.

As compared with England, which until a few years ago ruled and to a large extent still rules the markets of the world, it was an Englishman of note, Sir John Chadwick, statistician of the Royal Society, who, sitting in the rotunda of the Monongahela House in October, 1890, said, after visiting the industrial plants in the environs of Pittsburg, then much smaller in many respects than now, "the sceptre has departed from Judah. Not only will the United States govern the markets of the world, but Pittsburg will dominate the United States and the world if her steel masters but avail themselves of their opportunities."

England gets a large part of her ores from Spain, Africa and Australia. The costs are higher because of the distance from whence they are obtained, and also for the coke used in smelting them into produce steel. The highest average prices for Connellsville coke f. o. b. cars in the Connellsville region during the last 24 years was less than \$1.50 per ton; the costs in Durham and other coking regions of England were never below \$3.50, while the ore costs were much higher than in Western Pennsylvania, and this notwithstanding that wage rates are generally double what they are in England.

With all the great advantages coming from enormous capital, unequalled natural advantages in the supply of the raw materials entering into the manufacture of its products; with ample ground room for extension and widening of scope of manufacture into higher forms, the next question is the excellence of the means of reaching the markets of the world, which necessarily so immense a concern must reach in order to attain the maximum economy of production. In many branches of manufacture the cost of getting the article to the consumer is as great as it is to produce it. Pittsburg offers railway lines which reach out in all directions, as the spokes of a wheel radiate from its hub. Until recently business men generally gave but small attention to the advantages lying at their door for reaching wider markets by means of water transportation, and effort has brought the needs of improving the navigable rivers to the attention of Congress, and appropriations have been made for improvements, which, when completed, will give manufacturers an outlet to the Gulf of Mexico and the domestic markets of seventeen States tapped by the Ohio and the streams which form a part of the Mississippi, including the Missouri and Arkansas, lessening the cost of transportation and bringing her products into new markets.

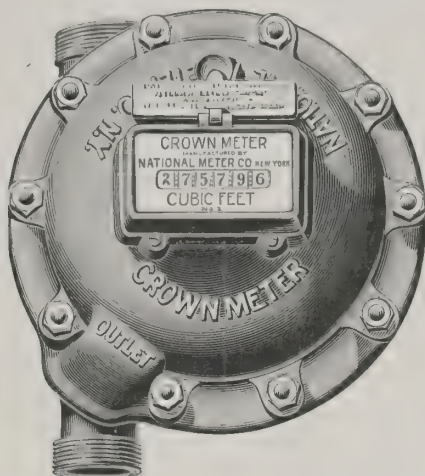
The Carnegie Steel Company, Ltd., produces one-tenth of the pig iron of the United States; more billets and Bessemer steel than any other firm by a large percentage, and the H. C. Frick Coke Company owns and operates nearly 13,000 ovens in the Connellsville region and controls the production of about 80 per cent. of the coke, the annual product of which is about 8,000,000 tons with an oven capacity for making about 12,000,000 tons. Its capital is nominally \$25,000,000, and it employs directly and indirectly in the neighborhood of 20,000 men and boys.

—The Henry R. Worthington Company, manufacturer of pumping machinery, has just received word through its London office that the exhibit of Worthington pumps at the Hungarian National Exhibition at Budapest has been awarded a grand millenium medal. This medal is the only award made for pumping machinery at the exhibition.



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Over 175,000 in Service.**

[JANUARY, 1897.]

City of Highland Park, Illinois.

NATIONAL METER CO.,  
298 Broadway, New York.

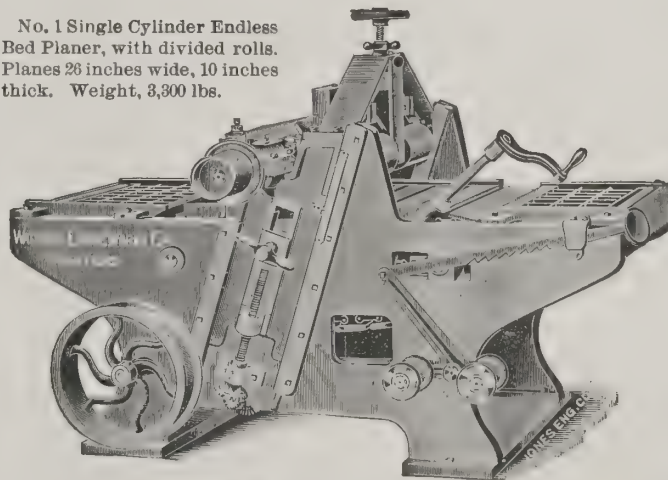
GENTLEMEN:

Replying to your favor of the 3d inst., would say that the city of Highland Park adopted the meter system in their water works in the winter of 1894-95. The result has been a material increase in revenue from the system, and a decrease in pumpage of at least 40 per cent. The water takers are well pleased with the service, as each pays for what he actually consumes. The city derives another advantage from the fact that leakage is quickly discovered, thereby increasing the economy of operating the system. Our experience has fully satisfied the most skeptical that meters soon pay for themselves in increased revenues on the one hand, and reduced cost of operating on the other.

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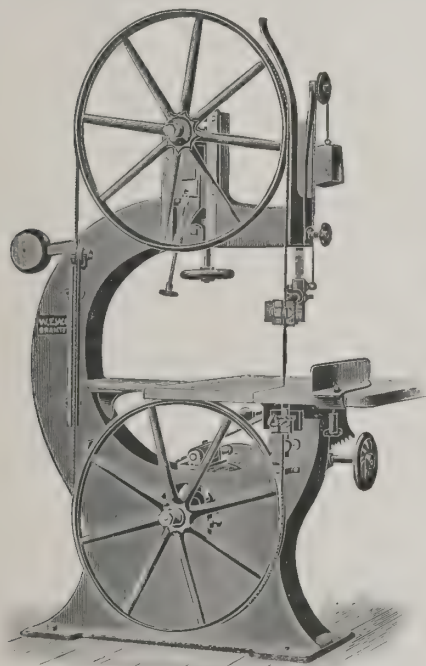


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Planes 24 inches wide up to 6 inches thick. Best all-around machine.

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Long experience in the export trade is  
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No. 3.—36-inch Wheel. Weight, 2,000 lbs.

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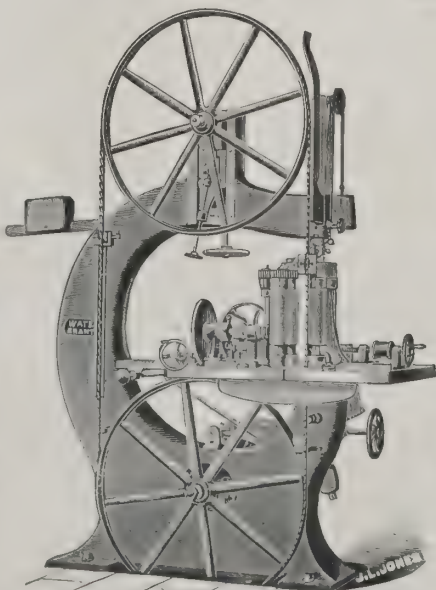
No. 5 Band Resaw.—48-inch wheels; saws 24 inches wide, 5 to 40 feet per minute. Resaw swings clear of machine when required. Weight, 4,500 lbs.

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No. 7 Band Resaw.—54-inch wheels; 4-inch saws; cuts 30 inches deep and to center of 10 inches. Weight, 5,300 lbs.

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### A Remarkable Invention.

MR GRANT BRAMBEL, a telegraph operator at Sleepy Eye, Minn., has been at work twelve years on a new type of engine, recently perfected it, and has received an offer from an English syndicate of \$1,600,000 for his rights—something over \$133,000 per year. After granting the option he was obliged to reject an offer of a raise of \$50,000 by another company. The inventor has developed an entirely new principle, whereby an engine developing 40 horse-power can be carried around under a man's arm. The largest one yet built, 250 horse-power, occupies a space of 6x18 inches on the floor, stands less than two feet high and weighs 300 pounds, and has been running ten months with perfect satisfaction. In a very interesting account of his invention, given to the *Minneapolis Journal*, Mr. Brambel says: "I first got the idea of a rotary engine from the turbine wheel. I couldn't see why steam couldn't do what water did, especially when steam had qualities that water lacked and that were essential. You know that when a little turbine is hit by a column of water no bigger than your pencil something has to go. You take a smaller wheel, mechanically correct, and turn against it an inch steam jet at 100 pounds or over, and allow for the steam expansion, and why won't you get power? I knew that it was necessary to get the greatest possible development of the steam expansion in order to give success to my idea, and I have been working along that line for twelve years. It took a great many models and a great many failures to get the thing right. I have had engine after engine that seemed to be perfect, and would spin along like a top, only to stop when some unexplainable point was reached. I have had problem after problem, and, finally, about five years ago, I hit the machine substantially as it is to-day. Since then the experiments have been in the line of possible improvements, but I haven't found many, and I think—I believe—it will be hard to get anything simpler, more powerful or better in its way than what I have."

In view of which we are inclined to think that invention does pay.

### A New Hydraulic Appliance.

AT a recent exhibition of hydrants, gate valves or other hydraulic appliances, a very ingenious pipe-tapping machine was shown. This was connected by a sleeve having a patent safety valve gate with a 6-inch pipe, through which water was kept rushing with a pressure of 35 pounds to the square inch. A drill, worked by hand by two men, cut out in 12½ minutes an oblong piece of the iron as a scoop cuts a cheese, leaving the water confined by the gate, and the sleeve as a connection to fit another pipe into. To make such a connection with the appliances usually in use in city water departments would necessitate shutting off the water supply from a whole section of the city for 10 or 12 hours. Another invention was a machine for calking the joints of pipes with lead. The present method of doing this is to make an embrasure around the joint deep enough for a man to work in and to perform the operation by manual labor. The new machine encircles the pipes just below the point with thin iron bands that control a box of lead. The lead is thus brought into contact with every portion of the joint. A small hammer follows the box, driving the lead home. The steam which works the hammer furnishes the heat to keep the lead liquid.—*Tradesman*.

### Mining Machinery for South Africa.

ON January 6th the Gates Iron Works, of Chicago, shipped from New York by steamers *Lady Furness* and *Kurdistan*, sailing direct to South African ports, thirteen carloads of mining machinery, weighing over 500,000 pounds, consigned to Johannesburg.

As illustrating the ease with which foreign shipments are now made, we note that the various railroad freight lines issue through bills of lading, as in this case, to that remote part of the world, and hence such shipments can be made as easily as to any domestic point.

It is claimed that the Gates Iron Works have had a shipment by every steamer leaving New York for South African ports during the past three years and are now among the largest shippers from the United States to South Africa.

### American Machinery in Europe.

MR. CHAS. DAVIS, of Cincinnati, has returned from a trip of six months abroad, during which time he visited Russia, Sweden, Norway, Denmark, Austria, Germany, Belgium, France and England. He reports a demand for American machine tools, and says a remarkable development is now going on in Russia. The Russian Government is encouraging the industries of the Empire by important concessions and orders of large magnitude to manufacturers in that country. He corroborates the statement that only the better grades of machine tools and those having a special adaptability to the purpose required can find a ready market in Europe. While in England he visited the great London Cycle Show, held at the Crystal Palace, December 5th to 12th, where his company had a display of tools devoted to the manufacture of bicycles. The Pratt & Whitney Company, the Garvin Machine Company and other American builders were also represented. He reports the show, which was the largest ever held there, a great success, heavy orders having been secured by all the American exhibitors.

—The Betts Machine Company, of Wilmington, Del., are shipping one of their horizontal boring and drilling machines to Adelaide, Australia. The shipment is made by Warner's Line to Philadelphia, thence by American Transport Line to London, and forward via Suez Canal to destination.

### American Machine Tools in England.

IN a conversation with Mr. Wm. S. Accles, who has had considerable experience with the introduction of American machine tools into England, and is now in this country, making his headquarters at 136 Liberty street, N. Y., we obtained his views as to the European, particularly the English, market. Mr. Accles has met with such success that he proposes to establish an agency for miscellaneous American tools in London. He expects to go abroad again in January. He says:

"Machinery for bicycle manufacture has been the pioneer of American tools in Europe. I believe that it will lead to a greater demand for American machinery for other and more general purposes—for making locks, engines, gas engines, etc. It is probable that a heavier class of machinery, for the manufacture of which England is now celebrated, will in the future be sought for in America.

"A cause which has tended to retard the introduction of American tools in Europe is the lack of permanent representation of the manufacturers, although they may indeed have fixed agencies there, and although this year they have had temporary representation from home. What is needed are men who understand the tools and who understand the ins and outs of foreign business.

"The foreign demand for bicycle machinery still continues. Early in the Summer manufacturers were perfecting their plans. Buying took place during the Summer and continues, and will continue, as a result of the annual cycle shows in London, the Stanley and the National."—*American Machinist*.

### Cigarette Machinery.

THE making of cigarettes by machinery is comparatively a new industry.

Formerly cigarettes were made by hand, and the Spaniards were the first Europeans who wrapped up finely cut tobacco in paper in order to smoke it. They still find a difficulty in getting accustomed to cigarettes made by machinery. In Germany there has been a great increase in the number of cigarettes smoked, and the cigarette industry has made great progress during the last ten years. The centre of the German cigarette industry is Dresden. In France, where cigarettes are smoked to a very large extent, the smokers made their cigarettes themselves for a long time, either with their fingers or with the help of little wooden rollers. Cigarette machines were first introduced into France in the year 1864; in Brussels about 1870. In 1875 the French Regie bought the first cigarette machine invented by Durand. In 1880 this was followed by the "Lejeune," invented by Decoufle. The last-named mechanic also invented the "Leblond" machine, in 1882, and later the machine for ungummed cigarette cases, which was taken up by the French Regie in 1889. The "Eclipse," a much more wonderful machine, was soon afterward invented by Pollard, an American. This machine had a capacity of 20,000 to 25,000 cigarettes per hour. A newer American machine is the "Ludington." The "Eclipse" and the "Ludington" have been introduced into all the best cigarette factories in this country and England.

### Western Mining Machinery Exported.

THE Colorado Iron Works, of Denver, Col., U. S. A., a few days ago closed a contract with the Mazapil Copper Company, of Saltillo, Mexico, for three latest improved elliptical bowl slag trucks. Messrs. J. W. Wilson & Co., of this city, who are the purchasing agents of this copper company in the East, claim that in many instances orders have been placed in the West for a certain class of mining machinery, due to the difference in price. They have, however, recently shipped a considerable number of heavy pieces of machinery and tools to that company from here, consisting principally of engines, boilers, dynamos, etc. One other good contract was also closed last week by the Colorado Iron Works, of Denver, for a double pot slag truck for the Compañía Minnera Fundidora y Afenadora, of Monterey, Mexico. The same iron works also sent recently a 6,200 foot "Finlayson patent" wire rope tramway for the Noble Fire Mining and Milling Company, at Daudon, B. C.

—The Watertown Steam Engine Company, of Watertown, N. Y., encouraged by the business which they have lately been doing with Japan, have decided to open an office in that country. Recently they closed a contract for high-speed engines to be used in operating an electric-light plant in one of the large cities of Japan.

—The Bates Machine Company, of Joliet, Ill., U. S. A., has closed a contract for a 2,000 horse-power Corliss engine for shipment to a large gold mining company in the Rand district, South Africa. The engine is for running a milling plant. The same manufacturers, it is said, also shipped an engine of 1,000 horse-power to the same district recently.

—Henry Disston & Sons, of Philadelphia, recently received an order direct from the Purveyor of the Sultan of Turkey for a full assortment of every article that they manufacture. Accompanying the order was an intimation and request that as something important was behind it the shipment should be full and complete in every particular, embracing every article they manufacture.

—Two of the largest wheelbarrow factories in this country, viz.: the Kilburn & Jacobs Manufacturing Company and the Lansing Wheelbarrow Company, report a very satisfactory business for export during the current year. Orders have been received by most every mail from Australia and the Spanish American republics, which demonstrate that the building and opening up of various industries in these countries is evident.



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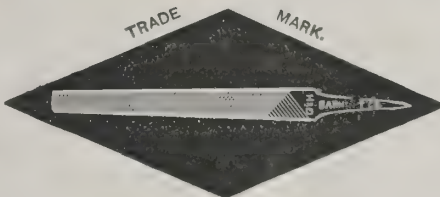
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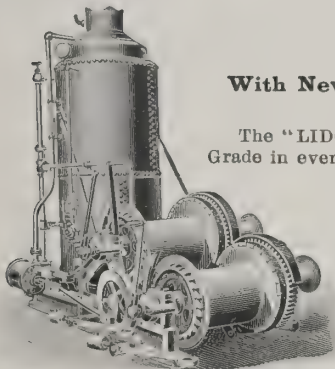


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**DECATUR FAIREST WHEEL WORKS,  
DECATUR, ILL., U. S. A.**

This machine is fully covered by Letters Patent No. 538,916, and all infringements will be prosecuted to the fullest extent of the law.



### Items of Interest to Exporters and Importers.

It is reported that President Diaz of Mexico has placed an order with the Barney & Smith Car Company, at Dayton, O., U. S. A., for the construction of a palace car train. The order covers dining, sleeping and library cars, and other cars.

A prominent exporter to Uruguay and Colombia claims that these markets have never been better for plated ware. The smallest single shipment that he has made for three months has been twenty cases.

Eight carloads of car wheels manufactured in Alabama went to Mexico in December over the Pensacola and Progreso line.

The Laidlaw-Dunn-Gordon Company, of Cincinnati, O., U. S. A., it is reported, have lately received some good export orders for its steam pumps, among them were three pumps for Japan and one for India.

Messrs. Browne, Beeche & Co. have completed the shipment of a good-size air compressor plant, which was built by I. P. Morris Company. This plant is for one of the largest silver mines in the world.

An order for ten iron tanks of 18,000 gallons each has been received by an exporter to Mexico. They will be shipped knocked down.

One of the largest shipments of chairs made this season went to South Africa recently. It consisted of 3,000 dozen.

A new mining drill has lately been placed upon the American market by a manufacturing company in Pueblo, Cal. The machine, instead of making a piston of the drill itself, is to keep it stationary in the hole, and hammer it on the outer end, exactly as is done by hand power. The drill is inclosed in a pipe and revolves in the hole, and is pushed forward, as it is deepened by a coil spring. The little trip hammer in the cylinder strikes very rapidly, and the loosened rock is blown out of the hole by the admission of steam. One mine has bought nine, and another mining enterprise in the gold district has ordered the same number.

The Peckham Motor Truck & Wheel Company, Kingston, N. Y., U. S. A., are making several of their standard trucks for Brisbane, Australia.

At the present time there are owned and controlled by the railroads and private car companies of America nearly 1,500,000 freight cars, or, in other words, enough cars to make continuous trains reaching from Boston to San Francisco, with an engine for every 45 cars.

The use of hollow shafts for stationary engines is making progress in this country. The Bethlehem Iron Company is to supply twelve of these shafts for use in the various street railway power plants of Chicago.

The Westinghouse Machine Company, of Pittsburgh, Pa., U. S. A., have just completed a shipment to France of one of their 1,200 horse-power "compound" engines. The approximate weight of this engine is 145,000 pounds, and its value about \$18,000. It will be erected in Paris.

A leading American shovel manufacturer reports the sale of 375 dozen shovels for export. Of this number 150 dozen are for Australia, 100 dozen for Mexico. The balance is divided in small lots, principally for the Central and South American republics.

The Colombia Government has just sent to an export house here a conditional order for 20,000 pairs of shoes for the militia. If these can be bought at prices obtained heretofore from Europe it is believed American manufacturers will be given the preference.

The material for a complete steel market building for the city of Tampico has been ordered from E. K. Pedrick & Co., New York, U. S. A., and will be shipped within the next six weeks by the Ward Steamship Line to that city.

It is reported that a Chicago company is building a stamp mill at Winslow, Ariz., U. S. A., the object being to crush and ship to Chicago petrified wood from the famous petrified forests of that vicinity, which will be made into grindstones, it having been proved that it is especially adapted to that purpose.

The Michigan Lubricator Company, Detroit, Mich., U. S. A., are bringing out quite a number of new devices in the line of lubricators, oilers, etc., which will be found illustrated and described in their 1897 catalogue, which will soon be ready for distribution.

A large shipment of American trunks was recently sent to France. This is believed to have been the first shipment of trunks to that country.

The American Engine Company, of Bound Brook, N. J., is about to ship one of its new American Ball engines to the Chinese Government. This engine is to be used in driving the machinery for the coinage of silver.

The Ramapo Wheel and Foundry Company, of Rampao, N. Y., U. S. A., recently shipped eighty pairs of 36-inch Snow's boltless steel-tired wheels on steel axles to Brazil for the Paulista Railway. The order also included 120 loose tires and 120 loose axles. The Paulista Railway is the second largest road in Brazil. It is controlled principally by British capital, which is the reason its orders do not come directly to this market, but through London export houses. Most of its rolling stock, however, is of American manufacture.

Within the last month a number of policemen in the City of Mexico have been put in wheel practice, and the capital will soon have bicycle-mounted officers.

The National Machinery Company, Tiffin, O., U. S. A., manufacturers of wire nail making machines, recently shipped one of their large header and spike machines to Japan, and are doing quite an extensive business with other foreign countries at present.

### Various Notes.

—A carload of broom handles will be shipped by next direct vessel to Port Elizabeth by a New York export firm.

—A single order for two carloads of plows was filled for Sydney, Australia, by an export commission house in December.

—A prominent sewing machine company claims to have shipped last week for the port of Para, Brazil, alone, 1,000 sewing machines.

—A New York machinery house reports that the demand for American bicycle-making machinery in Germany is constantly increasing.

—The *Journal of Commerce* says: "Russia is purchasing American type-writers, one shipment of \$5,000 having been made this month."

—A prominent locomotive manufacturer will have completed within ten days and ready for shipment a "compound locomotive" for Salvador.

—Five hundred iron and wood dumping wagons, such as contractors use here, have been ordered from a Western wagon works for Buenos Ayres.

—An export house has been obtaining bids for a plant of machinery to go to Chili, consisting of three hoisting engines and two return tubular boilers.

—An order for several thousand feet of cast-iron pipe was recently placed with a Southern manufacturing concern, and is for prompt shipment by rail to Mexico.

—One of the heaviest shipments of box shooks to the West Indies this season left New York early this month. It consisted of several carloads and goes by sailing vessel.

—The Holly Manufacturing Company, of Lockport, N. Y., U. S. A., it is claimed, has been awarded the contract for the complete sanitation plant of the waterworks in Mexico City.

—Eight carloads of railroad castings for Mexico were shipped from New York during the first week of this month. There were switches, crosses and some special structural work included in the shipment.

—During the month of November, 158 harvesting machines left this port for Buenos Ayres. For the same port there were also shipped in that month 1,946 cases of plows and 1,357 cases of sewing machines.

—Two export orders for iron safes were recently placed in New York, one for Mexico, consisting of eleven safes of unusually large sizes, and one for Central America, for thirteen of ordinary size. Both orders are to be shipped at an early date.

—A Chambers street hardware firm received an order for Australia from an export house which will take them two months to fill. There are large quantities of builders' hardware, carpenter's tools and small implements included in the order.

—From Pittsburg, Pa., there were shipped last month to Mexico twenty-five tank cars and twenty platform cars for mining purposes. The same house also sent seventy pairs of wheels with axles, together with a ton of other castings and forgings.

—The West Coast Iron Bridge Company, of San Francisco, Cal., U. S. A., has recently closed contracts for several iron bridge structures with the government of San Salvador. The material will be shipped to Acajutla or La Libertad as soon as ready.

—G. Amsinck & Co., New York, U. S. A., report satisfactory export business in railway equipments to Colombia and San Salvador. A number of locomotives were shipped by this firm to the former country about a month ago, and two the other day for the latter.

—The Kelly & Jones Company, of Greensburg, Pa., U. S. A., have recently shipped to Johannesburg, South Africa, a quantity of brass and iron valves and fittings for water, steam and gas, and they report increased interest in American manufacture in that section.

—The Barber Line steamer which sailed on January 9th for China had a quantity of rails on board. Several inquiries for rail freight room have been made, and it is expected that by the next steamer sailing for China a much larger quantity will be sent out.

—A representative in New York, of a large firm of agricultural machinery manufacturers received last week an order for three carloads of implements to be shipped immediately to Australia. The firm referred to states that it has shipped more agricultural machinery to Australasia in 1896 than during the two previous years.

—Owing to the recent advance on billets, we have been informed by a member of an export firm, it is expected that the large demand in manufactured steel, such as rails, wire, nails, etc., which had increased to such a satisfactory proportion, will be affected very materially if the question of prices is not soon settled by the American manufacturers. Cables indicating the propensity of foreign buyers have already been received on the subject, and contracts for Japan and Australia are waiting to be placed pending the action of the billet pool.

—Sloss Iron and Steel Co., Birmingham, Ala., recently sold 30,000 tons of Alabama pig iron to a firm in Calcutta, India, and it is reported that this firm wants as much more. The Tennessee Coal and Railroad Company shipped 2,500 tons to Liverpool, and has inquiries from Rotterdam, Genoa and other European points aggregating 30,000 tons. The only difficulty that stands in the way of the Birmingham iron manufacturers doing a larger foreign trade at the present time is the impossibility of obtaining favorable foreign rates, because of the present heavy grain and cotton movement.





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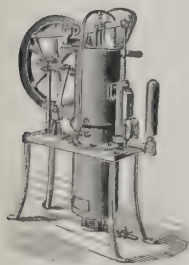
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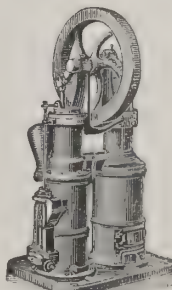
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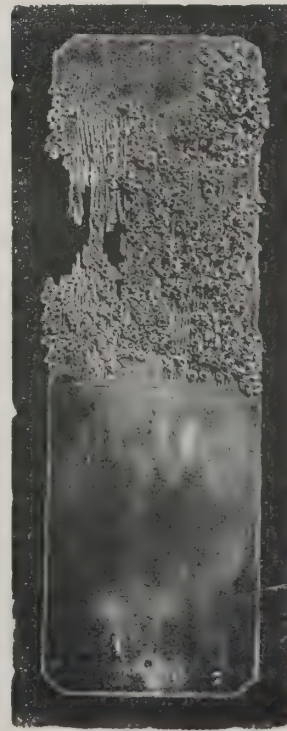
JERSEY CITY, N. J.

U. S. A.

### REMARKABLE FACT.

This cut is a copy of a photograph of a board having one end painted with New Jersey Copper Paint, manufactured by Harry Louderbough, proprietor of New Jersey Paint Works, Jersey City, N. J., U. S. A., and placed in the water at Port Royal, S. C., for five months. Upon the unpainted end you can note the ravages of the salt-water worm so destructive to wood, and also the large number of barnacles that have fastened upon it. Observe the painted end, where New Jersey Copper Paint was applied—its splendid condition.

The board here represented was placed in the water at Port Royal, S. C., by me, and left in the water five months. The painted end was as good as when it was placed in the water. MILLS EDWARD, Master Schooner "Florence Shya."





### Rubber Teeth Now.

AN entirely new thing in teeth has been invented which places artificial masticators within the reach of the masses. The inventor and manufacturer is a well-known New York dentist, who says that his new process will enable him to make complete sets of excellent teeth for \$1.50 or \$2, and still reap a satisfactory profit.

The invention is a departure from anything heretofore introduced in modern dentistry. It consists of a complete set of artificial teeth made entirely of rubber, the base, or plate, and the teeth being formed integrally. In their manufacture an ingenious method is employed which not only insures a correct formation of the artificial masticators, whereby they are made to closely resemble nature's product, but also simplifies the process of what is called "setting the teeth up." A hollow, flexible metallic matrix, which both internally and externally reproduces the formation of the natural teeth, is made, which, when filled with rubber and vulcanized, produces a perfectly formed set of teeth.

One of the greatest obstacles to be overcome was the shading of the rubber teeth, but this the inventor has accomplished by means of a chemical bleaching process. Another, but less satisfactory, process of shading is by the admixture of different-colored rubbers.

From a sanitary standpoint the rubber teeth are perfect, there being no joints, as in all other forms of artificial dentures, in which the secretions of the mouth may find lodgment. A more expensive form of the new teeth is that in which the masticating surfaces are capped with a continuous metallic facing, which renders the dentures practically indestructible and unbreakable. Gold, silver, platinum and aluminum have been used for making the crowns. One of the greatest advantages of the rubber teeth, aside from their cheapness, is their extreme lightness. They weigh less than half as much as any other form of denture.—*New York World*.

### American Rubbers in Demand.

THERE is a big field in Germany for American rubbers, says United States Consul Monaghan at Chemnitz in a report to the State Department. At present Russia is supplying most of the rubbers worn in Germany, selling through agencies all over the Empire, but neither the Russian nor German made article is as good as the American product, being clumsy and lacking in durability, although it commands the market just now by reason of its lower price. The consul also submits some statistics to show how Germany is building up a large trade at England's expense with New South Wales. He gives a list of the principal German exports to that colony, and says that they are not nearly as good as our own wares, and with the advantage of cheaper and quicker freights across the Pacific the United States should certainly have this trade.

The Germans, however, keep their goods up to or above the sample, pack them with great care and employ competent salesmen, speaking several languages, and thus continue to extend their trade in all quarters. Circulars are in Mr. Monaghan's opinion not worth the paper they are printed on as a means of introducing goods.

### Boston Shoes Going Abroad.

EVERY week sees large shipments of footwear made from Boston to foreign points. This business is showing a steady and gratifying increase every year, and is developing not only in England, France and Germany, but in lands even more remote from the United States. Recently a Boston firm shipped 700 pairs of ladies' boots and Oxfords to Sydney, New South Wales. They have the promise of a 2,000-pair order from the same place a little later. A most agreeable feature of the transaction is the fact that the firm had the cash for these goods before they went out of the store. That's a feature of the export shoe trade which warms the cockles of Boston shoe men's hearts.

South Africa is another far-off point to which Boston is sending many shoes. Sweden is calling for them also. Canada can't do without them, despite the duty. The sale of Yankee shoes in England has lately shown a substantial increase. One venturesome individual has started for Japan with samples of New England footwear. It won't be long, at this rate, ere Boston will shoe the world.

A GERMAN shoe paper rises to remark that the shoe machinery now made in Germany is equal in every respect to that made in this country. The *American Boot and Shoe Recorder* feels compelled to rise and take exceptions to this statement. German shoe machinery is only a crude imitation of the American article. It lacks all the fine parts and workmanship of the work done on this side of the water. The writer has inspected both makes, and knows whereof he speaks. It is a notorious fact, that as soon as a new machine is produced in the United States one is bought by German makers, copied and placed on the market at a lower price than the American article and represented as "just as good." The German manufacturer who owns American shoe machinery, and is posted in this respect, knows better; it is only the innocent buyer who is liable to be caught. If the American shoe manufacturer would make up goods suitable for the German market there is no question but he could secure a large patronage there, but American shapes would not sell.

—Prices have been sent by the Board of Trade, Cincinnati, Ohio, to its Mexican agent, J. A. Lowe, of over 20 different lines of goods for which there is a demand from the Mexicans. Of these lines large quantities of dry goods, glycerine and kaolin have just been sent down in answer to orders. This is in addition to the large shipments of all sorts of staples of all kinds already made.

### American Trade with Norway and Sweden.

WE ship merchandise direct to these countries each year to the value of about \$5,000,000, and import therefrom in the same way about \$2,500,000 worth. But this direct trade does not stand for the actual trade. By far the greater part of the trade is done through England and Germany. Transshipments are made at the ports of these two countries, so that the real volume of the trade done can only be estimated. Their leading imports from the United States are cotton, mineral oils, wheat and fertilizers. Other important commodities are pork, flour, sugar, molasses, resin, hides, skins, vegetable oils, maize, rye, raw tobacco and machinery. American canned goods find a good sale; California wines and Kentucky whiskeys also would be in favor if their sale were pushed properly. American goods in general are sold in Norway and Sweden at lower prices than similar articles from other countries. Sirup, for instance, by its worth and cheapness, has driven the English sirup out of the market. Our grain and flour also are cheaper than the German or Danish, and give a good chance for competition.

### Japan's Foreign Trade.

THE foreign trade of Japan for the first half of 1896 showed imports to exceed exports by 26,000,000 yen. This was owing, on the one hand, to the extraordinarily depressed condition of the American market, and on the other to the unusually large importation of machinery and other materials in consequence of the mushroom growth of industrial enterprises. Moreover, the machinery imported will sooner or later turn out products that will be exported in their turn. Another point to be noted is that 15,000,000 yen out of 26,000,000 yen (that is the total of the excess of imports) represented cotton and wool. Further, the greater part of the remaining 11,000,000 yen represented machinery and other articles of iron. Very few luxuries were imported. In the months of June and July the Mitsui Bussan Kaisha alone is said to have exported cotton yarns to the amount of 2,000,000 yen. When most of the cotton and wool imported in the first half of the year comes to be exported in the form of yarn, etc., the Japanese export business promises to increase materially.

### Fishing Rods for England.

IT is reported that Geo. A. Clark & Co., of Utica, N. Y., are building up a lucrative business in fishing rods in England. About one year ago a consignment was shipped by the firm to Redditch, England, the lots, sixteen in number, ranging in price from \$1.65 per dozen for a low grade of wooden rods to \$30 a dozen for split-bamboo rods. The prices obtained from English purchasers are equal to those paid to home dealers, while the foreigners are compelled to pay large freight rates. It is very evident that the rods cannot be made as cheaply in England as in America or they would not be bought here. Last year the firm manufactured 4,005 split-bamboo rods in its Trenton factory, and this season the output has been increased to about 10,000. English business promises to grow so in volume that it is anticipated large improvements in the plant will be made necessary.

THE *Papier Zeitung* attributes the cheapness of American printing, as compared to the German product, to the superiority of our printing presses, which, it says, are acknowledged to be unrivalled by those of any other country. Another advantage, in the estimation of our contemporary, is the typesetting machines and the facilities for casting rollers, stereotyping, color grinding, etc., which cost far less here than in Germany.

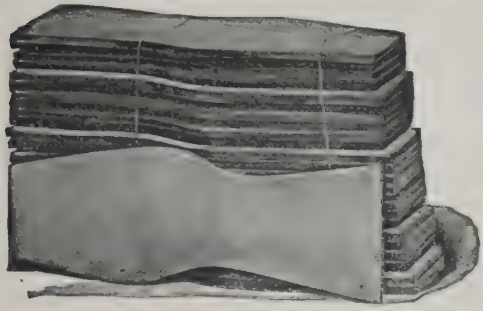
A CHICAGO genius has recently invented a rocking-chair and churn, which may be readily attached so that the operator may sit in the chair, rock, read and churn all at the same time. After placing the cream in the churn, an attachment by means of a tube and air-blasting apparatus is made with the chair, and the person appointed to churn the butter has only to sit down and rock. The movement of the rocker causes a flow of air through the tubes, which in turn agitates the cream and produces the butter.

A WELL-KNOWN French house which is actively engaged in the introduction of articles of American hardware, covering sporting goods, agricultural implements, gardening tools, stable fixtures, housefurnishing goods, etc., is anxious that any American manufacturers who desire to find an opening for their goods in France should mail catalogues, rates and other information concerning the same, stating the most advantageous prices offered. The title of this house is M. Pernois & Co., and the address is at the Docks of the Campagne, Ligny-en-Cambresis, Nord, France.—*From Hardware*.

—A member of a prominent export firm of this city, doing business principally with the mining districts of Mexico, claims that the outlook for next year's business in machinery is satisfactory. "We have already sent estimates for over \$250,000 to the mining districts of Mexico. Our prospects of at least receiving the orders for half that amount are good, and we are only one of many who are catering to that particular trade."

—"It is interesting to note," says the *Paper Mill*, "the export business of American wood-pulp news paper. The largest and liveliest demand for it comes from England, and especially from London, a fact which nobody would have believed ten years ago to be even a future possibility. There is also a steady demand now for American paper from Mexico, South America (Buenos Ayres particularly) and even from Australia."





American shoemakers and shoe-menders have got ahead of you. They don't buy whole sides of sole-leather now.

A shoemaker wants 2 or 3 grades and 4 or 5 thicknesses.

We cut sides, make 8 grades and 15 thicknesses, sell the cobbler the grades he wants, and the rest, including the waste, to somebody else, who wants that.

All well served; no waste; no using leather because you've got it.

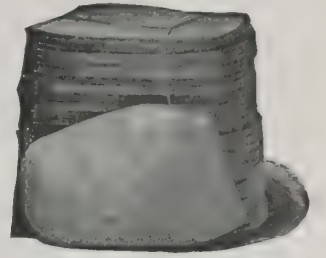
We do this business better than anybody else—it is a close wholesale business.

Do you want to know about it?

BAXTER SCHENKELBERGER & CO.,

350 Congress street, Boston, U. S. A.

50 Tabernacle street, London.



## THE DENSMORE, "The World's Greatest Typewriter."

WRITES 84 CHARACTERS.  
LIGHTEST KEY STROKE, HANDIEST, QUICKEST, STRONGEST.

Represented in more than 200 Cities in the United States and in

LONDON, 85 Queen Street.  
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AUCKLAND, N. Z., 14 Victoria Arcade.  
TORONTO, 37 Adelaide Street, East.  
WINNIPEG, Manitoba, 408 Main Street.  
MUNICH, 17 Weinstrasse.  
ST. PETERSBURG, Puschkinskaja 7.  
BUENOS AYRES, 349 Calle Reconquista.  
SYDNEY, N. S. W., 114 Pitt Street.  
QUEBEC, 25 St. John Street.  
VICTORIA, B. C., 28 Board of Trade.

FROM THE U. S. GOVERNMENT.

DENSMORE TYPEWRITER CO.

Gentlemen—We have now in use in the Bureaus of this Department nearly eighty Densmore machines. We have no complaint from the users of them, hence we conclude they are giving entire satisfaction. Respectfully,

(Signed) HIRAM BUCKINGHAM, Custodian.

FREE: Illustrated pamphlet with testimonials from leading concerns.  
Active, responsible **DEALERS DESIRED** in all open foreign cities.

DENSMORE TYPEWRITER CO., 316 BROADWAY, NEW YORK, U. S. A.



## JENKINS BROS.' VALVES,

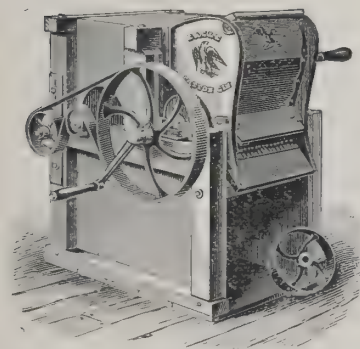
Globe, Angle, Cross, Check, Safety, Blow-Off, Etc.,

Are manufactured of best steam metal, and are suitable for any pressures of Steam, Oils or Gases. Contain Keyed Stuffing-Box and Disc Removing Lock-Nut, making them the easiest and cheapest to keep in repair. The Jenkins Discs used in these Valves are manufactured to stand High Pressure Steam. Warranted as represented. None genuine without Trade Mark. Send for Catalogue.

JENKINS BROS. 71 JOHN STREET, NEW YORK, U. S. A.



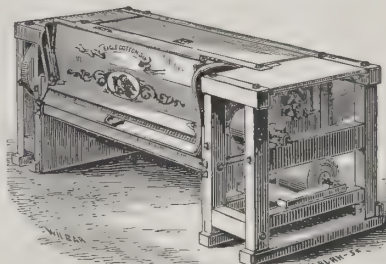
## EAGLE COTTON GINS.



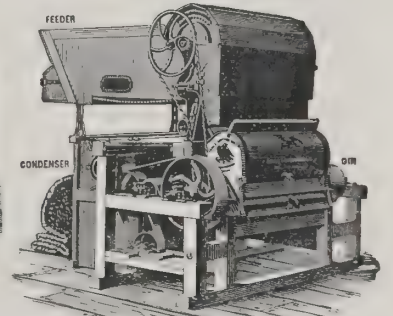
These Gins enjoy a BETTER REPUTATION THAN ANY OTHERS OF THEIR CLASS IN EXISTENCE, and are PREFERRED to all others made, on account of their STRENGTH, SIMPLICITY, DURABILITY, the amount and EXCELLENCE of the work they accomplish, and the RAPIDITY of their operation.

For further details, illustrated Catalogues will be furnished on application.

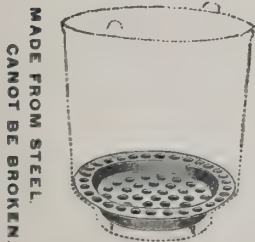
Eagle Cotton Gin Co. { FORMERLY Bates, Hyde & Co. } Bridgewater, Mass.



Power Gin with 12-inch Saws.



Power Gin with 10-inch Saws, with Feeder and Condenser.



## SAFETY KETTLE BOTTOM.

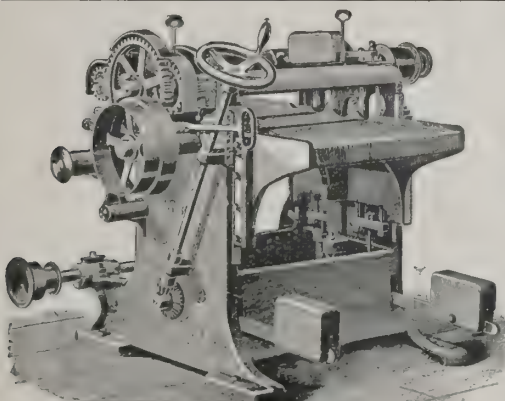
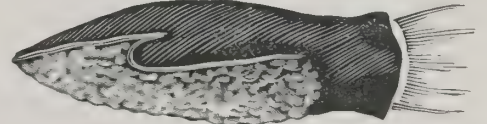
Prevents Meats and Vegetables from burning while cooking. Can be used for various purposes, either as Steamer, Broiler, Toaster, etc.

## Stove Polishing Mitten,

FOR BLACKING AND POLISHING A STOVE.

It is one of the most valuable articles ever introduced in the household. Keeps the hands clean. Every woman will appreciate it after one trial. Easily fits the hand, has a waterproof back, and the whole front is made of the most durable and soft sheepskin, tanned with the wool on, superior to all others. With each mitten we give a dauber. By using the Stove Polishing Mitten, blacking a stove ceases to be dirty and disagreeable, which every lady dreads; for in the old way she knows it will take twenty-four hours to get the blacking out of her finger nails. But our mitten does away with all that, for she can make her stove shine like a mirror, and in one minute go to the parlor, entertain company, make bread, or sit down and sew on the finest white goods, without a speck of blacking on her hands. \$18.00 per gross F. O. B. at New York.

For Particulars address **DIAMOND HARDWARE CO., 620 Atlantic Ave., Boston, Mass., U. S. A.**



No. 93. Panel Planer, 24 inches wide, 6 inches thick. Weight, 2,000 lbs.

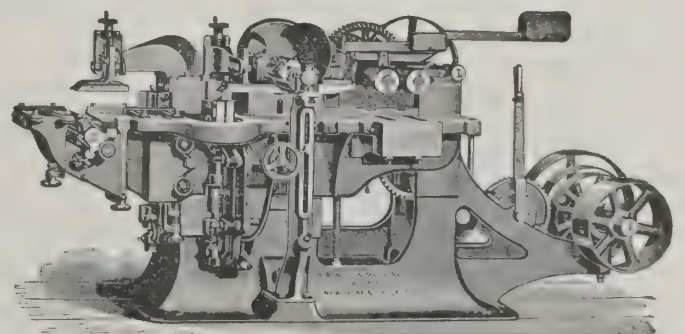
Send for Catalogue "F" at once, illustrating and describing

## HIGH-GRADE Wood-Working Machinery.

S. A. WOODS MACHINE CO.

BOSTON, MASS.: U. S. A.

Correspondence solicited.



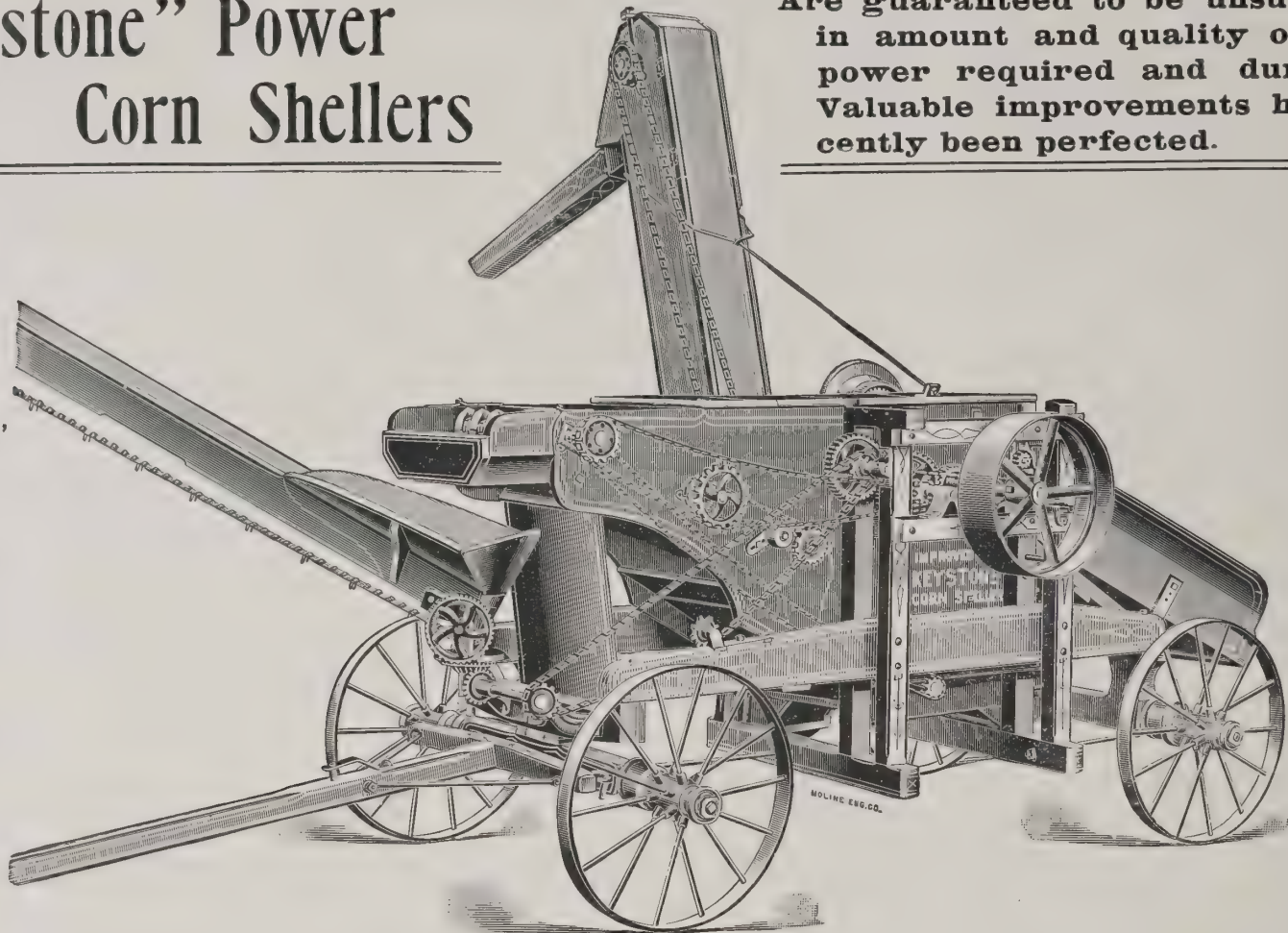
No. 130. Outside Moulding Machine. Works 4 sides, 7, 8 or 9 inches wide. Weight, 3,000 lbs.



# "Keystone" Power Corn Shellers

Are guaranteed to be unsurpassed  
in amount and quality of work,  
power required and durability.  
Valuable improvements have re-  
cently been perfected.

"X. ."  
"KEYSTONE"  
"PONY"  
ARE FOR  
POWER  
OR  
HAND USE.



6 HOLE,  
4 HOLE,  
2 HOLE  
"KEYNOTE"  
ARE  
SELF-  
FEEDING.

Made by

SEND FOR DESCRIPTION AND EXPORT PRICE LIST.

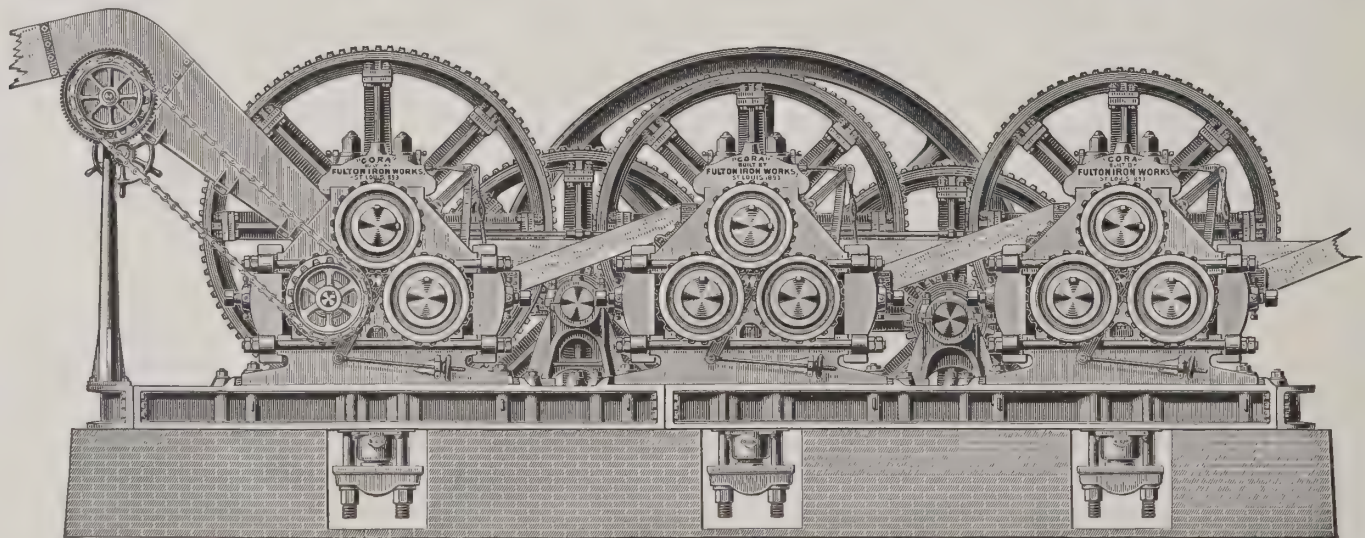
Address Export Office,

**KEYSTONE MANUFACTURING CO.,**  
STERLING, ILLINOIS, U. S. A.

**KEYSTONE MANUFACTURING CO.**  
B 19-21 Produce Exchange, New York, U. S. A.

# "CORA" Nine-Roller Cane Mill.

CORRESPONDENCE SOLICITED.



ESTIMATES FURNISHED.

Built by **"FULTON IRON WORKS,"** St. Louis, Mo., U. S. A.

Per S.S. "COPTIC."

FULTON IRON WORKS, St. Louis, Mo.

HONOLULU, H. I., June 17th, 1895.

Dear Sirs: The nine-roller mill and Corliss engine built and erected for us by you last year has given perfect satisfaction, and we take pleasure in furnishing you with the following report covering work performed by it during the season just closed. Days grinding, 104 $\frac{3}{4}$ ; Tons of cane ground, 61,617.928; Tons of cane ground per day, 588.238. Extraction: 92.49 per cent. total sugar; 82.13 per cent. of cane; Dilution, 7.91 per cent.; Fibre in cane, 11.02 per cent. Average load on hydraulics, 313.2, 334, 344.5 tons.

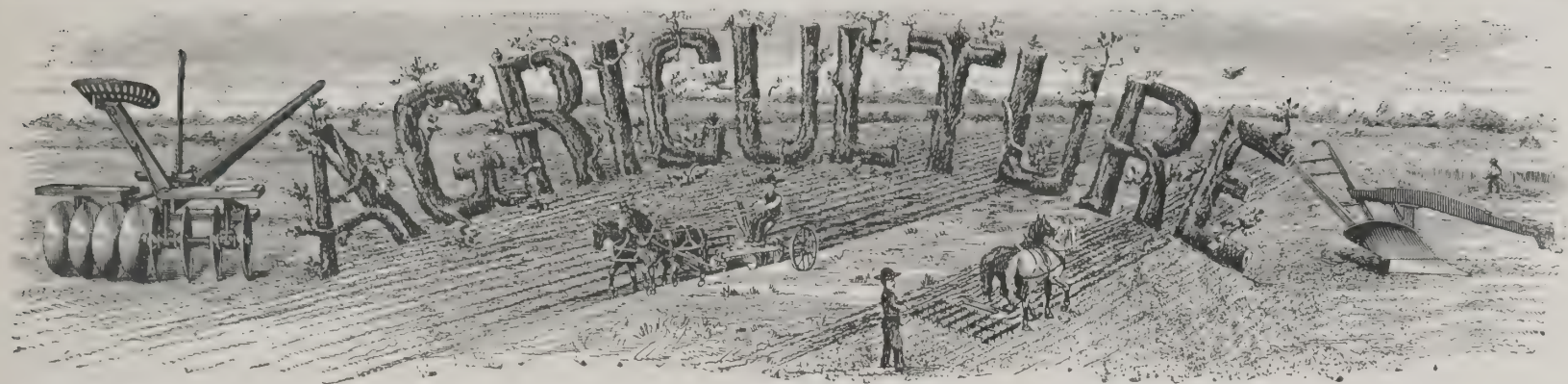
It is hard to say just what is the capacity of this mill, as our boiling house is not of sufficient size to admit of a prolonged test, but we would say that we have ground on a short run over 50 tons of cane per hour, and with an increase of from 50 to 75 tons in the load on the hydraulic obtained an equally good extraction. We believe we have the best mill on the Islands.

Very truly yours,

EWA PLANTATION CO.,

E. D. TENNEY, Secretary.





DEVOTED TO THE FOREIGN TRADE IN AGRICULTURAL MACHINERY AND IMPLEMENTS

## AGRICULTURAL MACHINERY.

THE day has passed when successful farming can be done by manual labor. The movements of agricultural products in the world's markets bring into close competition the productive methods, as well as the natural advantages of soil and climate, of all farming communities. The progress made in the application of invention and science has been accompanied by the same series of personal hardships that ensue from competition in all manufacturing and mechanical arts. The factory and workshop gradually fall behind in which the machinery is not kept up to the highest standard and adjusted to the constant changes in processes; the owners are ruined and the property passes into other hands, either to be reconstructed or to fall into disuse. In the same manner one farmer who keeps up with modern science improves his farm, and by treating the land as an instrument of production, yielding increased crops in just proportion to the intelligence with which it is worked, he thrives; while the next farmer, working his land as his father worked it, as a mine and not as a laboratory or instrument of production, becomes gradually poorer, the land is exhausted, while the owner joins the ranks of the discontented and becomes an advocate of all sorts of fallacies in the vain effort to save himself from the consequences of his own incapacity.

Successful farming is now dependent upon the intelligent use of seeds, soils, fertilizers, machinery and implements, and good, low-cost transportation to the markets of final consumption. The salvation of old and the prosperity of new farming communities are alike involved in the strides of improvements made possible by the skillful work of mechanics in manufacturing establishments and the scientific work of chemists in laboratories. Those farmers who fail to utilize the facilities and knowledge thus placed at their command have no choice but to fall far in the rear in the struggle for prosperity. The man who works in the old, unaided ways stands in point of productive power when compared with the man who works in up-to-date ways as an imbecile. The productive power of the latter is from five to fifty times that of the former, and his work is more easily done.

## Maintaining Fertility.

IT is much easier, less expensive and better in every way to maintain the fertility of the farm than to suffer it to become depleted and then be forced to turn around and effect a restoration. Among the things necessary to maintain fertility at the lowest cost we may mention thorough, clean culture; rotation of crops (in which clover and other legume finds place); the feeding of live stock and the careful saving and judicious utilization of manure. Careful attention to these points, while the land is yet new and productive, will forestall the evils of poor farming—constant subtraction with no corresponding addition. While the man who skins the land usually moves along, leaving some better farmer to do the recuperation act, soil robbing averages up a losing operation. Look at the abandoned—the run down—farms that are to be seen right alongside of well-managed, fertile, paying ones in nearly every neighborhood in the older States; farms producing scant crops, hence scant manure piles and scant profits. See the increasing difficulty, in many places, of securing a catch of clover, and the extensive use of commercial fertilizers in recent years. Not that we would condemn or discourage the use of commercial manures where experiments show that they pay, for in our own experience on thin, retentive soil they have paid us twice over: first, in the direct effect of a high-grade article upon a market crop, and, second, in the residual effect upon the growth of a renovating crop—clover—which followed. Through the prodigious quantities of soil products consumed by our urban population, the great cities of our

land, like great, bottomless pits, are swallowing up farm fertility at a fearful rate, and we feel like commending every effort that is put forth looking toward the adoption of measures whereby a more extensive and less expensive return will be made of city refuse.

It is the wanton waste of the virgin fertility with which Nature has endowed the soil that we would warn our readers, more particularly the young and inexperienced who are opening up new farms, or who have come into possession of fertile farms, against. We must profit by the experience of those who are struggling to build up that which careless greed and ignorance have torn down, for if we follow in the footsteps of the soil robber we shall indeed find the school of experience a dear school in the end.—*Epitomist*.

## Thinks Kentucky Whisky Ought to Be Exported.

THE English, the French, the Germans, and, for that matter, nearly all the peoples across the water, are presumptuous enough to believe that a beverage that oils their tongues, tickles their palates, spurs their appetites, and cheers their hearts is good enough for all the balance of mankind, and to flatter themselves that the world at large, once it is introduced to their beverage, will indorse their taste and judgment. Hence the efforts made by the winegrowers, the distillers and the brewers of Great Britain and the Continent to create a demand in foreign countries, which efforts are generally successful, and in some cases, no doubt, beyond their anticipations.

Now if there be a finer beverage in the world than Kentucky whisky, we have failed to find it. We mean real Kentucky whisky, old and ripe and fragrant. Take it as you please; take it straight; take it in a cocktail, in a sour, in a toddy, in a morning-glory; take it for sickness; take it as a tonic; take it as an appetizer; take it to inspire courage or a speech or a pen; take it before breakfast, during the day, or after the office is closed; take it as you please, and it hits the spot and does the work quicker than any other agent on earth.

It is one of the marvels of the age, this old Kentucky beverage, and yet the modesty of Kentucky distillers has operated to restrict its use to this country, when a little assertiveness on their part would create a demand abroad for all their surplus, no doubt, and perchance so change the habits and thoughts of those who drank it as to improve the civilization of the world and give to mankind in general somewhat of the picturesque condition of life in the blue-grass region of Kentucky.

Some few distillers in this State have a limited export business, but no real efforts have ever been made in that direction. At the present time, however, a number of distillers are laying plans to secure customers in other countries than this, and we are of the opinion that rich results will follow if intelligent efforts are made and persisted in. It would be profitable, we believe, for a number of distillers to form an export association and send men to various countries to inquire into customs duties, laws, habits of people, methods of trade, etc., and to lay out for the subscribers a line of intelligent work. This would be far better, we think, than for each concern individually to incur the pioneering expenses. Such an association should also have exhibits of Kentucky whiskies at all expositions in foreign countries, with expert mixers to concoct the various drinks made from them by the American barkeeper. It is a big work, full of detail, but it would pay, and some day it will be undertaken.—*Bonforts*.

## Timber for South Africa.

EASTERN TEXAS has within a year set up an important trade in timber with South Africa. This long range trade is the outcome of the improvement of the Sabine Pass, a waterway that the United States engineers have been dredging for years.

When the timber agents of Mobile, Pensacola and other Gulf ports discovered the possibilities of the lumber trade through Sabine Pass they began to make contracts for timber in Southern Texas and to ship the product to South Africa, where the activities of a rapidly growing population in a region almost bare of trees created a demand for timber.

The timber belt of Texas is a region of about 30,000 square miles. The timber is transported partly by water, being floated down the streams, and partly by rail. Already several railroad lines penetrate the timber belt, and connecting with these lines are many private tramways that lead to the saw-mills.

Many hundred thousand acres of the Texas timber belt are as yet untouched



by the ax, and in those parts of the region where the lumbermen are at work only the pine has been cut. Many of the trees are two feet in diameter, and some are much larger.

South Africa has come in very opportunely to take the place of the Cuban market. The trade is carried on chiefly by large schooners, though steamers are engaged in it. The timber is used in wasteful fashion, but it is believed that the Texas forest belt will outlast the forests of Maine and even of Michigan. It is estimated that there is in the Texas timber a half century of cutting.

### Tremendous Gain in Exports.

THE following table compiled from Government statistics shows the increase in the exports of manufactured goods for 1896 over those for 1894:

Manufactured articles exported.	1896.	1899.
Agricultural implements .....	\$5,027,915	\$5,176,775
Art works .....	391,963	524,077
Blacking .....	295,505	533,058
Bones, hoofs, horns, etc. ....	260,675	321,680
Books, maps and other printed matter .....	2,620,046	2,338,722
Brass and manufactures of .....	808,427	872,396
Carriages, street cars and parts of .....	1,649,154	1,884,658
Cars for steam railroads .....	1,700,521	1,003,942
Casings for sausages .....	1,280,514	1,771,680
Chemicals, drugs, dyes and medicines .....	7,400,953	9,063,358
Clocks and watches .....	1,302,813	1,460,375
Coke .....	184,509	500,169
Copper, manufactures of .....	19,697,140	19,720,104
Cotton manufactures .....	14,340,886	16,837,396
Cycles and parts of .....	115,825	1,898,012
Fertilizers .....	5,038,445	4,400,593
Fish, dried, fresh and canned .....	3,492,201	5,448,758
Flax, hemp, etc., manufactures of .....	1,712,744	1,868,601
Fruits and nuts, dried, canned and preserved .....	2,424,239	5,679,066
Glass and glassware .....	922,072	1,062,225
Glucose, or grape sugar .....	2,328,707	2,772,335
Grease and all soap stuff .....	1,380,299	1,516,763
Gunpowder and other explosives .....	1,002,126	1,381,102
India rubber, etc., manufactures of .....	1,461,842	1,858,556
Instruments for scientific purposes .....	1,534,277	2,522,217
Iron and steel, manufactures of .....	29,220,264	41,160,877
Leather and manufactures of .....	14,283,429	20,242,765
Musical instruments .....	972,590	1,271,161
Naval stores .....	6,790,958	8,843,564
Oil cake and meal .....	8,807,256	7,949,647
Oils, mineral, manufactured .....	37,083,891	56,261,567
Paper and manufactures of .....	1,906,634	2,713,875
Paraffine and paraffine wax .....	3,820,656	4,406,841
Provisions, meat and dairy products .....	145,270,643	131,503,590
Soap .....	1,139,722	1,278,645
Tobacco, manufactures of .....	3,849,996	4,320,361
Vegetables, including canned and pickled .....	1,744,462	1,655,050
Vessels sold to foreigners .....	99,042	154,610
Wood and manufactures of .....	27,712,169	31,947,108
Wool, raw .....	90,676	855,950
Wool, manufactures .....	774,580	913,609
Zinc, manufactures of .....	456,856	228,605
Totals .....	\$362,397,612	\$408,783,441
Balance in favor of Wilson bill .....		46,385,829

### In the Furniture Market.

IT is gratifying to note that our export trade in furniture is steadily increasing, and that American manufacturers are reaching out to the end of the earth. Every month shows the shipment of American furniture to some new market. This is especially true of desks and chairs, and it is seldom now that a vessel clears from New York the manifest of whose cargo does not include an invoice of either one or both of these articles. This trade is capable of almost unlimited expansion, as nowhere else in the world are the facilities for the production so great, the machinery so perfect or the labor so skillful.

The British colonies, except Canada, continue to be our best customers, and it is hardly worth while to waste time and money in the attempt to push trade to the northward. The average Canadian is more English than the real Englishman himself. The American desk, which is good enough for the Bank of England or the East India offices, is not good enough for the Montreal shopkeeper. It is much easier to sell American furniture in British Africa than in Toronto.

Should this extension of the foreign furniture trade continue, and the export concerns who are now exporting it have hardly as yet made a beginning, a single year of normal home business will wipe out that bane of manufacture—a surplus of production.—*Furniture Trade Review*.

J. APARICIO & CO., export merchants, New York, are reported to have shipped a good-sized ice-making plant of machinery to Costa Rica within the past month, and it is said that many inquiries are being received nowadays for ice making machines of small capacity from parties in tropical countries. Ice is a luxury still unknown in many tropical communities, but wherever in such countries the business of making artificial ice has been established the demand for it has been found to soon exceed the early expectations of those engaged in the enterprise, and consequently the capacities of the machines first employed for its production. It is, therefore, advisable for those who contemplate engaging in this branch of business, to buy at the outset plants of the medium size rather than the smallest obtainable, as is generally done.

### Our Stores and Shops Will Be Open.

AS to our rising American industries, the question is earnestly asked at times, what would be the effect on them of a general European war. Let us rather first ask, what probabilities or possibilities are there of a general European upheaval? It is surprising how much good newspaper and ink are wasted in talking about this possibility. We are told that wars of nations occur in cycles, and that seldom a generation passes without a great upheaval. Already more than thirty years have elapsed since an outbreak, and many believe another is smoldering behind the thrones of Europe. All countries are expending enormous sums on defenses; navies are being increased and millions of money are going into ironclads of enormous power and into guns, torpedoes, torpedo boats and everything else that is calculated to make future wars the bloodiest the world ever saw. When we recall what trifling events, what ordinary selfishness has precipitated in the past we need not wonder wars are likely in the future.

What, then, of our position? Are we safe, and, if so, what effect will likely be produced upon our industries and our agricultural interests? Despite hostile legislation, backed up by prejudiced and ignorant sentiment, Europeans are depending more and more upon America for cereals and meats, as well as fruits. American manufactured products are also gaining stronger grounds abroad. This dependence must grow if war comes. With Europe in arms an enormous increase in consumptive capacity sets in. Apart from that, American methods are coming into vogue. American systems of agriculture and of manufacturing are being introduced, and war, whether long or short, can only increase the commercial exchanges between the two continents. No war can last long. The existing engines of destruction could wipe out armies in a day. A European war would be, in the nature of a duel, an exchange of shots, so to speak, and the result would be reached.

Meanwhile, we have only to mind our own business, and, so far as North and South America are concerned, to let Europe know she must mind hers. We are done with king tomfoolery, from the Penobscot to Cape Horn. If Europe has not sufficient intelligence, and Christianity and statesmanship, to keep from fighting, and will fight, why, we will have our price lists and catalogues all ready for mailing—but all settlements must be cash.—*Carriage Monthly*.

### Not a Class Invention.

THE bicycle is cosmopolitan and universal. It appeals to no particular class. The world is its field. People of all conditions and ages patronize it. Those who formerly declared that its high price would always keep it among the luxuries, to be enjoyed only by the wealthier classes, were as wide of the mark as are some of the latter-day prophets who say that the making of cheaper bicycles will result in having it associated only with commoner, workaday classes of people.

As the years go by, it grows in favor with rich and poor alike. Older people are riding it more and more, and so are the younger. The seven ages of man are now represented on the bicycle. Its coming was like the dropping of a pebble in the smooth sea of the world's thought. Each wave of influence is broadened with the passing of time.

The bicycle refuses to be related to any narrow or restricted use. It is a vehicle of pleasure and of profit, of pastime and of business.

The maid and matron, the millionaire and the mechanic, the professor and the plowman, the grandsire and the schoolboy, all find delight in the use of it.

Bicycling is as common and as natural as breathing. It is the multitudinous answer to a universal demand. It is for everybody—everywhere.—*L. A. W. Bulletin*.

### Trade with Mexico.

ST LOUIS business men are finding a splendid opening in Mexico, which is growing rapidly, and no doubt will soon assume immense proportions. As an indication of what is going on it may be mentioned that within the past few days two carloads of horses have been shipped into Mexico and five carloads of mules destined for Cuba. Four cars of brick machinery have been shipped to Campana over the Mexico Central Railway. This was the first shipment of machinery ever made into Central Mexico, and will prove an opening wedge.

A St. Louis firm has shipped pumps to Guaymas, and fire engines are wanted at Jimenez. Chihuahua wants St. Louis fireworks, and Sonora is asking for catalogues and price lists on shelf hardware, trunks and general merchandise. Corn in 50,000-bushel lots is being shipped to Tampico and Progreso, and at a good profit. Mexico wants St. Louis bicycles and steel rails for street railways in the cities of Mexico and Monterey. St. Louis hats are wanted in the States of Chihuahua, Sonora and Coahuila, and also shoes and photographic supplies.—*St. Louis Republic*.

—An American manufacturer has shipped over 2,000 hand pumps to England within the last three months.

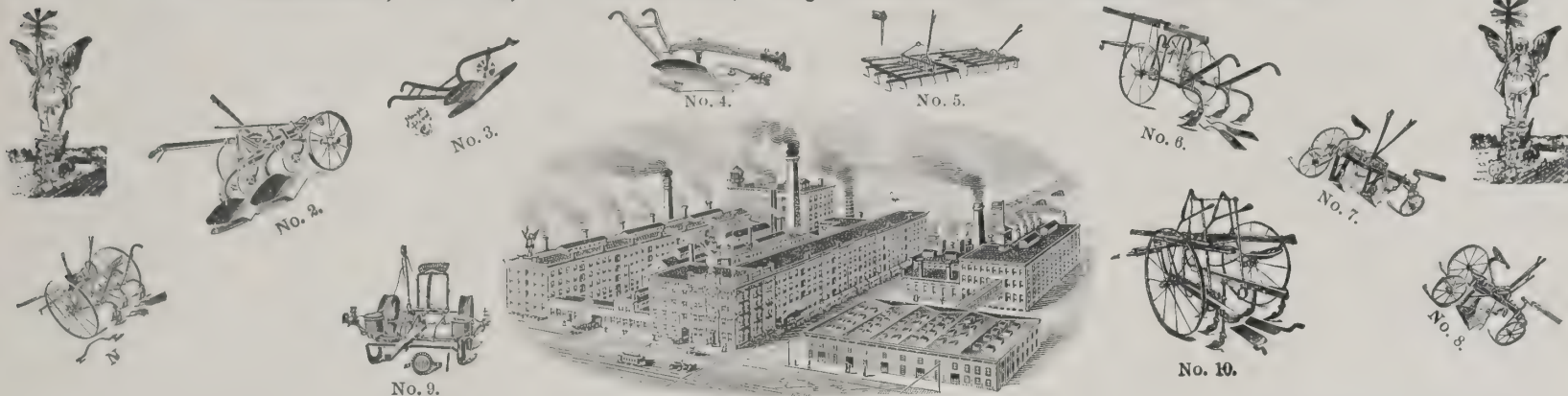
—The Martin Carriage Works, York, Pa., recently made an export shipment of six pleasure vehicles, which went to Africa.

—With the view of the advisability of supplanting the steam locomotives of Japan with electrical engines, Seryio Mine, a Japanese electrician of some note, has visited Baldwin's Locomotive Works, Philadelphia. He has been in this country since June studying the question, and has visited Boston, New York, Cleveland, Niagara Falls and Chicago.



MOLINE, ILL.  
U. S. A.**MOLINE PLOW COMPANY,**MOLINE, ILL.  
U. S. A.

MANUFACTURERS OF THE BEST GRADES OF

**Sulky, Gang, Wheel Walking and Walking Plows, Harrows, Disc Harrows, Planters, Seeders, Drills, Cultivators, Hay Rakes, Beet Machines. Etc.**No. 1 Dandy Combined Riding and Walking Cultivator.  
No. 2 Wheel Walking Gang Plow, 24 inches.No. 3 Steel Beam Plow with Rolling Coulter.  
No. 4 Wood Beam Plow with Rolling Coulter.  
F. O. B. NEW YORK.No. 5 Steel Lever Harrow.  
No. 6 New Western Cultivator.  
No. 7 Flying Dutchman Gang Plow.No. 8 Flying Dutchman, Jr., Sulky Plow  
No. 9 Moline Champion Corn Planter.  
No. 10 Germania Riding Cultivator.

Foreign Agencies:

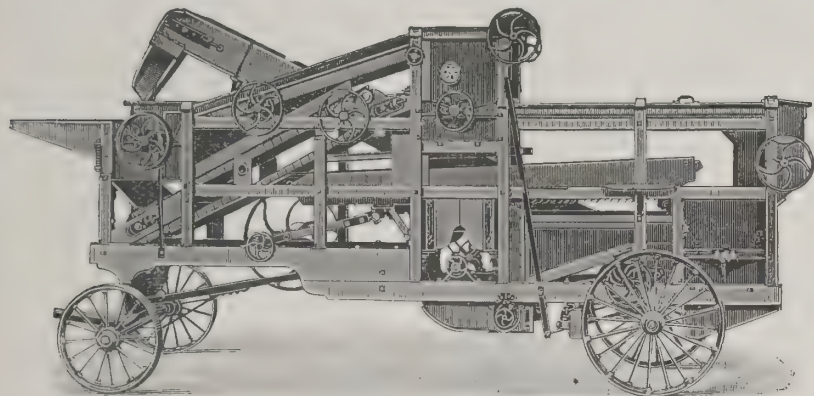
PEABODY & CO., New York City, for Continental Europe; Mess. MALCOMESS & CO., East London, Cape of Good Hope, Africa, for South Africa.  
JOHN & JOSEPH DRYSDALE, Buenos Aires, South America.

Send for New Catalogue.

**THE AULTMAN & TAYLOR MACHINERY COMPANY**

MANSFIELD, OHIO, U. S. A.

MANUFACTURERS OF

**Thrashing Machines, Saw Mills,  
STATIONARY, PORTABLE AND TRACTION ENGINES,  
Horse Powers,  
Tubular Boilers and Iron Tanks**

OF ALL KINDS AND SIZES FOR LOCOMOTIVES

Write us for DETAILS, PRICES and ANY DESIRED INFORMATION.

**COFFEE MACHINERY.****The Monitor Coffee Separator and Grader**

Will make clean separations and grade in one operation.

**The Monitor Coffee Milling Machine,**

The most perfect miller for coffee ever offered. It will do the finest work on tender as well as hard coffees, and do it without waste or breakage.

These Machines are in successful operation in many of the largest Coffee Houses in this country, and are well worthy of investigation by Handlers of Coffees.

Can be bought direct from manufacturers or through any reliable exporter.

**HUNTLEY MFG. CO., Silver Creek, N. Y., U. S. A.**

Is SUPERIOR to "CORN STARCH," "ARROWROOT," "SAGO," Etc.

**MAIZENA**  
(DURVEA.)Gold Medal Awarded  
"MAIZENA."

This is a brand for a preparation from the choicest parts of Indian Corn, or Maize, making a healthy and nutritious article of food, and a most

**DELICIOUS TABLE LUXURY.**

ITS PURITY AND DELICACY ADAPT IT TO BEING USED IN A GREAT VARIETY OF EXQUISITE DISHES.

**ENCOMIUMS TO ITS MERITS:**

LONDON, 1862. "Supremely Excellent."

BRUSSELS, 1876. "Notably Excellent."

PARIS, 1877. "Perfection in Preparation."

CENTENNIAL, 1876. "Notably and Absolutely Pure."

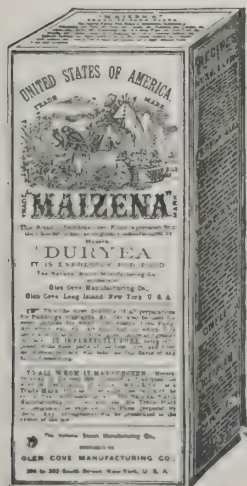
PARIS, 1878. "Best Produced of Its Class."

FRANKLIN INSTITUTE. "Superior Merit."

Paris Exposition,  
1889.

Put up exclusively by THE NATIONAL STARCH MFG. CO., successor to (Messrs. DURVEA) GLEN COVE MANUFACTURING CO., N. Y. U. S. A., in 40 and 20-pound boxes, in packages of 1 lb. and ½ lb., and may be obtained through all importing houses of South and Central America, and the West Indies, and all export houses of the United States and Canada.

None GENUINE without "DURVEA" appearing on the face of Package.





# ELECTRICAL NEWS.

## THE ELECTRIC INDUSTRIES OF THE UNITED STATES.

FROM a statement in the Christmas number of the New York *Herald* 1896, the following summary of the electrical industries in the United States is taken:

"In the electric-lighting field the total capital invested is given as over \$500,000,000. The number of plants, public and private, is over 10,000.

"For electric power the number of motors in use is estimated at about 500,000, valued at \$100,000,000.

"In electric mining the apparatus is valued above \$100,000,000; and for electric elevators about \$15,000,000.

"Electric railroading is, however, the most important of the electrical industries. The investment is over \$700,000,000. The number of trolley cars in use is over 25,000, and these run on over 12,000 miles of track. The electric railways represent more than 90 per cent. of all the street and suburban railroads in the country.

"The aggregate of all the capital invested in electric lighting, power, mining, elevators and railways is about \$1,500,000,000. This does not include the value of establishments that manufacture the machinery and apparatus.

"Some of the plants for the manufacture of electrical machinery and apparatus are among the largest industrial enterprises in the world, and as there are many concerns of considerable magnitude it is evident that their combined capital will run up into large figures. The constant struggle is to improve quality and increase efficiency."

It will be noticed that this statement makes no reference to the telegraph, telephone, fire alarm, police patrol, burglar alarm and sundry other electrical services which rank among the most important facilities of this electrical age. When it is remembered that the first telegraph line in the world was strung between the cities of Baltimore and Washington, in 1844, and that none of this wonderful electrical development was even thought of at that time, what the future may, in a few years, add to the comforts, refinements and ease of life cannot well be imagined. In the light of what has been accomplished the seemingly most improbable predictions cannot be reasonably rejected as impossible.

### An Electrical Laundry.

WE quote a description from *Electricity* (New York, November 25th): "The equipment of the laundry with electrically heated sadirons has reduced the number of employees at the ironing tables nearly one-half. The reasons why such results are possible are that the electric irons are constantly supplied with a uniform amount of heat, nearly all of which is absorbed by the work, and by reason of the constant supply every rub is equally efficient. There being no appreciable heat radiated from the iron, it is apparent that in a room where the temperature can be regulated, and there is no vitiation of the atmosphere due to combustion, much more work can be accomplished."

—Four carloads of iron telegraph poles were shipped direct to Mexico from the port of New York lately.

—An engineering company will soon make a shipment to Dublin of eight carloads of machinery for electrical purposes.

—Shipments of electrical appliances to Europe are increasing. One company alone has fourteen of their motors in French tramways and eighteen of them in Germany.

—The Edison Electric Illuminating Company, of New York City, supplies 240,000 incandescent lamps. This is the largest incandescent lighting system in the world.

—What is considered a good sized order for telephone material was placed recently by a Wall street export firm for prompt shipment to Japan. Heretofore the telephone and telegraph instruments and materials, which the Japanese do not manufacture themselves, have been bought principally in Germany. It is, therefore, of interest to note that American manufacturers are beginning to gain ground in this direction.

—What is said to be the largest dynamo ever constructed is now being built at the Westinghouse Electric Company's works, at East Pittsburg, Pa. It is for the Allegheny County Light Company, and when completed will weigh 90 tons. The field or base has been cast in two sections, each weighing 56,000

pounds. Its base is 17 feet 6 inches, so that the armature will be 16 feet 5½ inches in diameter. The dynamo will be of 1 500 kilowatts power. Four of them are to be built.

—A daily paper says that the Westinghouse Electric Company, Pittsburg, Pa., U. S. A., encouraged by the volume of foreign business which they have lately been doing, have opened branch offices in Japan, Argentine Republic, Chili and Mexico.

—A heavy invoice of electrical machinery and materials for Guatemala, C. A., was shipped by the steamer sailing December 30th. L. P. Rose & Co., the shippers, claim that it was one of the largest electrical material orders ever sent here from that country.

—An order was placed recently with an engineering company in New York for the necessary machinery to operate an electric-light plant of 1,500 lights. Two 150 horse-power boilers, a good-sized engine and two dynamos are the principal pieces of machinery included in this plant. It will soon be ready for shipment to South Brazil.

—During the month of December 700 cases of material were sent out for the electric light and power plant which is being erected at the town of Almachapan, Salvador, under the direction of Messrs. J. Aparicio & Co., of this city. The plant when completed will operate the electric-lighting system, a tramway and furnish sufficient power for a number of industries.

—By the steamer for Vera Cruz which left New York on January 2d an electrical and power plant was shipped for the lighting of the cities of Jalapa and Coatepec, Mexico, together with two neighboring small towns. There are two 300 kilowatt generators, the bases of which alone weigh five tons each, while the machines themselves weigh thirteen tons apiece. The transmission will cover ten miles. When complete and in operation the entire plant will have cost about \$150,000.

—The Edward P. Allis Company, of Milwaukee, Wis., it is said, are shipping seven carloads of machinery to South Africa. The machinery consists of three cross-compound, direct connected engines of 1,000 horse power each. These engines are to be used for electric power, to drive pumps and hoists in one of the largest mines there. Each engine weighs 100 tons. They are also preparing for shipment, through New York, for South Africa three direct-acting hoisting engines which will weigh 200 tons apiece.

—The Lagunayra Electric Light and Power Company, of Venezuela, which has been in operation about a year, is about to increase the capacity of its plant. At present the plant is worked by steam power, and it is the intention of the company to change it to hydraulic power. Bids for both electrical and mechanical appliances are being received at the company's office, 88 Wall street. When the plant is completed it will extend to the seaside resorts of Macuto and Maiquitia. Mr. A. De Castro, the consulting engineer for the company, will sail by the Red D Line steamer for Lagunayra on the 12th instant.

—United States Consul Asby, at Dublin, Ireland, has reported to the State Department that the Dublin United Tramways will shortly petition Parliament to permit extensive construction of new lines and to substitute electric traction for horse power upon existing lines. Other railway lines will also petition for permission to make extensions and to substitute electricity as the motive power upon their systems to such extent as they may choose. The consul states that should the action of Parliament be favorable to these various projects there will be a good demand for electrical goods in Ireland, and our manufacturers should have a share of the trade.

### Hot-Coffee Dinner Pail.

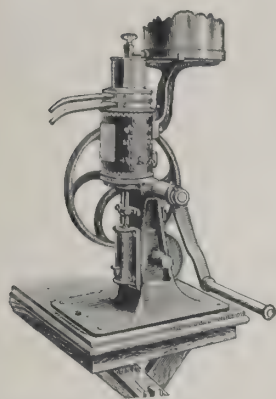
A HOT-COFFEE dinner pail is being placed on the market. This pail is divided into two compartments, the smaller of which contains the coffee can, and underneath it a small alcohol lamp-stove. This stove is packed with asbestos, rendering it safe and non-explosive. It is smokeless, odorless, quick working and economical in operation. Pouring one or two tablespoonfuls of alcohol through the wire gauze that covers the top of the stove, lighting it and placing the coffee can over it is all that is necessary. By the time the food is taken from the pail and the workman is ready to eat the coffee is hot. The pail is made in a thorough and compact manner, having as much space for food as an ordinary dinner pail, with the exception of the small space occupied by the alcohol stove. The ease with which the coffee can be heated will be appreciated by many who otherwise would have a cold dinner.

THE bicycle craze in Sydney is as active as ever, if not very much more so. Importers generally, from the chemist, linen draper, grocer, photographer down to the ironmonger, are turning their attention to the trade, so it is to be supposed that it is a most profitable traffic. With the competition that is now spreading the inevitable reduction of profits will come and the would-be users of this machine may regard this new form of commercial activity with satisfaction as being likely to result in a speedy reduction in prices. Anyway, if cycles continue to come forward as they are doing at present there is a fair chance of the market being glutted.—*Australasian Ironmonger*.

—Brussels, Belgium, will have an International Exposition, beginning April 24 and ending October 13, 1897. American manufacturers are invited to exhibit. A prominent importer and exporter to Belgium, speaking of this exposition, said: "This is an opportunity which should not be overlooked by manufacturers here. The field in that country for some of our manufactured goods increases yearly. England, France and Germany will be well represented."

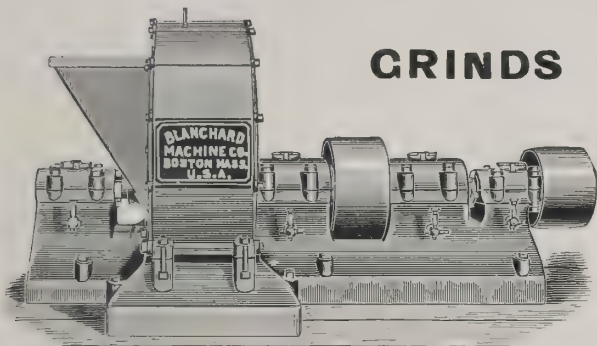


## CHALLENGE Job Press.



**General Offices, 74 Cortlandt Street New York.**

## GRINDS

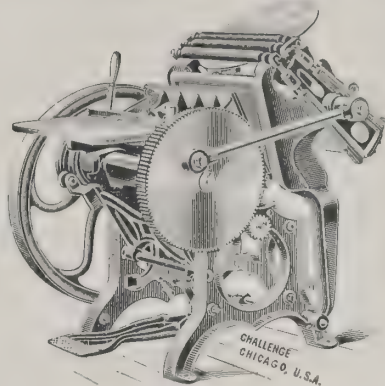


**BLANCHARD MACHINE CO., 303 Congress St., Boston, Mass., U. S. A.**

1 (Established in 1840.



Selling Agents,  
71 John Street, New York, U. S. A.



See page 31 in December Number for Ad. of our IDEAL Hand Cylinder.

MANUFACTURERS OF



**BOSTON, MASS., U. S. A.**

**THE**

**SIMONDS**  
MFG. Co.  
**GOLD**  
**MEDALS**  
**HIGHEST**  
**AWARDS.**

**PATENTED**  
1876

**NEW**  
ORLEANS  
1884

**BOSTON**  
1887

**SAN FRANCISCO**  
1889

**CHICAGO**  
1893

**AND**  
INNUMERABLE  
**AWARDS.**

**WE**  
**MAKE**  
**SOLID**  
**TOOTH**  
**AND**  
**INSERTED**  
**POINT**

**CIRCULAR  
SAWS.  
STRAIGHT SAWS  
SUCH AS  
GANG, MILL,  
MULAY AND**

DRAG  
SAWS.  
AND THE  
CRESCENT  
GROUND

AND  
ANS  
FROM  
ONE  
TO  
TWELVE  
IN  
ALL

EIGHT  
INCHES  
WIDTH.  
KINDS

**OF SCROLLSAWS  
WE ARE THE  
LARGEST  
MANUFACTURERS  
OF  
MACHINE KNIVES  
IN THE WORLD.**

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WE  
MAKE  
EVERYTHING  
IN THE SHAPE  
OF KNIVES

OUR  
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ARE  
SIMONDS  
MFG. CO. FITCHBURG, MASS.

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# MARSTON'S FOOT AND HAND POWER SAW

**JOHN M. MARSTON & CO., Boston, Mass., U. S. A.**



# "MONARCH"

## The Apex of Bicycle Perfection.

The finest equipped bicycle factory in the world (we have it) naturally produces the best bicycle—as near perfect as anything mechanical can be. Our 1896 models are the crowning glory of our unparalleled success as bicycle makers.

FOUR MODELS.

\$80 and \$100



Agents Wanted.

Write for Terms.

We also make the best of lower-priced machines, especially adapted to the jobbing trade—

DEFIANCE, eight models for adults and children, \$75, \$60, \$50, \$40, fully guaranteed

## MONARCH CYCLE MFG. CO.

Lake, Halsted and Fulton Streets,

CHICAGO, ILL., U. S. A.

MENTION THIS PAPER WHEN WRITING

## THE BLACK MFG. CO., - ERIE, PA., U. S. A.

We build bicycles of the finest quality only and have nothing to offer either in cheap or medium grade wheels. Our discount for export is 30 per cent., and we deliver machines properly boxed f. o. b. New York. Order through your commission house and send copy of order direct to us.



TRIBUNE MODEL 27.

Price \$100. Weight 23½ lbs.

This is our standard men's wheel and is suitable for all kinds of road use. It is built in three heights of frames, 22½, 24 or 26½. The wheels are 28 inches diameter; 26 inches will be furnished if preferred. Gear, 68; options, 60, 63, 72, 76 or 80; cranks, 6½ inches, 7 inches if preferred. If not otherwise specified, all machines will be fitted with Hartford or Morgan & Wright tires. All wheels are supplied with tool bag, tools and repair kit. Regular finish, black enamel, nickel trimmings. If a lighter wheel than the above is desired, order should specify Model 21, which will weigh with light road equipment about 20½ lbs.

## Tribune Bicycles.



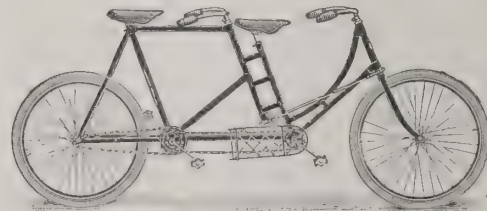
TRIBUNE MODEL 24. Price \$100.

Our ladies' wheels are built in three heights of frames, 20½, 22½ or 24 inches. 20½ inches is standard and will be shipped if not otherwise specified. Wheels, 28 inches, can be furnished, with 26 if preferred. Regular gear, 63; options, 56, 60, 68 or 72; cranks, 6 inches throw. The weight is about 24 lbs.

The Celebrated  
Cycloidal  
Sprocket.



Used on  
Tribune  
Bicycles only.



TRIBUNE MODEL 23.

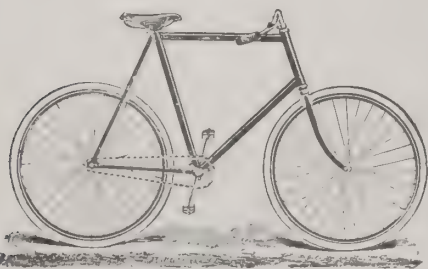
Price \$150. Weight 44 lbs.

Our tandems are also built with double diamond frame for use of men riders. Wheels are 28 inches; height of frame, 24 inches; ladies' forward frame, 20½ inches. Gear, 68; can fit with 72, 76 or 80, if desired.

## GOOD AGENTS WANTED

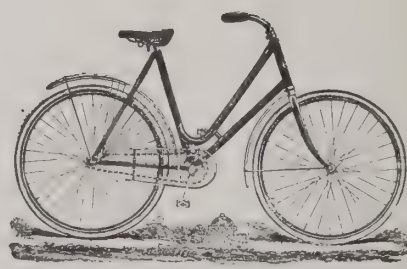
TO REPRESENT

## The Standard Wheel OF AMERICA.



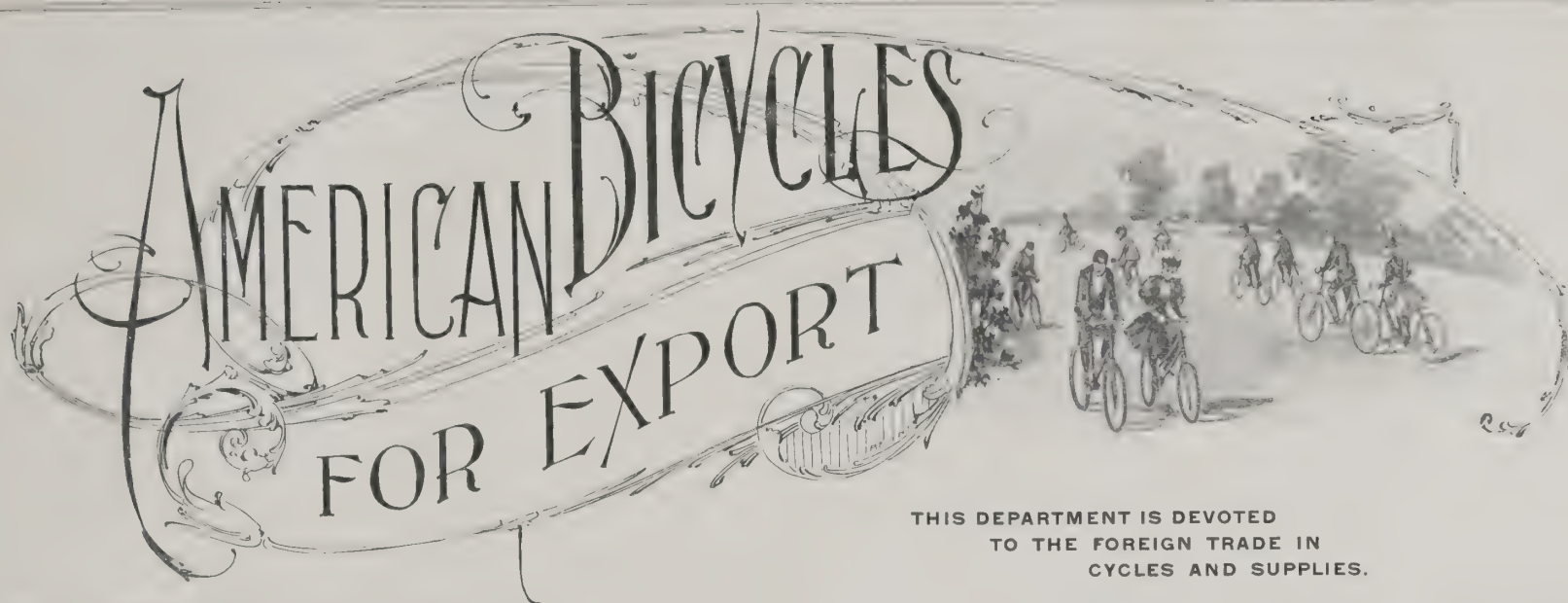
Write for Terms.

Write for Catalogue.



STANDARD BICYCLE MFG. CO., 71 Jackson Blvd., Chicago, Ill., U. S. A.





### The Latest in Wheels.

A CLEVER inventor has made it possible for the bicycle girl to ride her wheel twelve months in the year and to bid defiance to ice and snow, not to mention a gale or two. What is more, the fortunate young woman will not even have to furnish motive power for working her wheel, because there is a little gasoline motor just forward of the rear wheel which impels the machine at any desired rate of speed. The young woman may imagine herself a lightning express and travel at an astonishing rate, or move along as slowly as she pleases. Her Winter bicycle will protect her from the cold blasts, too, for she will sit behind a shield. But even this is not all. As much of the framework of the bicycle as is possible will be hollow, and these hollows will be steadily filled with constantly changing hot air, which is heated and forced to circulate through the pipes by means of the same heat that drives the motor. Thus, out of doors, in the cold, and facing a breeze, the bicycle girl who rides never need be cold or frostbitten.

The tires of this novel machine that is going to make wheeling possible in Winter are of the variety known as nonpuncturable. Fastened to them at regular intervals are small spikes, not of sufficient length to impede the progress of the wheel, but at the same time long enough to prevent the sudden slip and turn that always presages the unlucky fall. With tires thus equipped the bicycle girl can go wheeling whenever she likes. She has absolutely none of the usual discomforts to fear. The new outfit is better than the horseless sleigh, far better than the sleigh with a horse. There can be no runaway, and her steed is not affected by cold weather or too much oats.

There is no danger of losing control of the bicycle, for at the left of the rider and within easy reach of the hand is the handle of a brake. By grasping this and moving it either forward for the bicycle to advance, or backward to stop it, the movements of the machine can be regulated to a nicety. It might be thought that there would be considerable trouble in bringing it to a standstill without danger of toppling over, but there need be no fear of this, for when the speed of the machine slows down considerably the rider simply places her feet, which have heretofore been on the coasters, upon the pedals, and stops naturally. It is equally easy to make a start, for, with one hand on the machine, the rider gets a slow headway, and then vaults into the saddle, just as she would if she had an ordinary wheel. Once in the saddle, it is an easy matter to regulate the speed. Just how fast this new machine can go is still problematical, because the inventor, who is a Philadelphia man, has never driven the machine he has constructed to its limit. It can, however, be easily propelled at a fifteen-mile-an-hour gait without the slightest danger to either rider or wheel. In times when ice and snow are not to be encountered, the tire may be changed if desired, so that the machine can be ridden over the ordinary road, asphalt pavement or any material which the spikes would be likely to injure, without unpleasant results.

The aim of the inventor of this contrivance was to have the mechanism as simple as possible, so that it would not need a person of mechanical mind to operate it. The motor itself is a very simple affair, and the little tank underneath contains sufficient fuel for a century run. The rider need not pay the slightest attention to either motor or fuel, for the lamp from which comes the flame that drives the motor is fed steadily by an automatic feeder. So carefully is all the machinery, simple as it is, protected from air and dust that there is no fear of its becoming clogged or that the dress of the rider may possibly ignite from a flying spark.—*New York Herald.*

THE large increase in our exports of bicycles and parts thereof is well shown in the following figures taken from the official records. In the ten months ending October 31st the value of shipments from the United States amounted to \$3,080,154, against only \$158,551 the year previous. The amount sent to Great Britain reached \$1,138,270, a considerable portion of which was intended for transshipment to other points. The other principal shipments were British North America, \$514,910; British Australasia, \$349,059; Germany, \$216,232; France, \$116,136; other European countries, \$349,059; South American and other countries took only from \$1,000 to \$60,000.

### As to Our Wages.

WHENEVER the foreigner is driven into a corner and forced to advance a valid reason why American-made bicycles cannot be exported to his country and sold at the same price asked for domestic machines of an equal grade he invariably makes use of the argument that it is not possible owing to the lowness of foreign wages as compared to those paid to American workmen.

Let any one glance for himself over the weekly manifest of exports from New York. He will find from this record that bicycles and goods and wares of every kind pass out of the harbor to every quarter of the globe. If he will look further he will observe that not alone is it true with regard to the bicycle, but in every type of exports the wages or earnings recovered from the sale are higher in rate and more especially in purchasing power than in any of the countries to which these goods are sent. If the rate of wages were the prime factor governing the cost of production, and if upon that rate rested our power of competition, not one dollar's worth of this vast quantity of goods representing our excess of products could be sent out in exchange for the comforts and luxuries of which our imports mainly consist.

A well known recognized authority in mechanical matters lays down the proposition that high wages and the use, in connection therewith, of labor saving machinery are the real secrets of cheapness of production. The true policy of the employer of labor, in his opinion, is to encourage workmen of the best class, by liberality in the wage scale, to the most efficient use of the most perfect machinery, so that there is large increase in output, meaning increased wages for the workmen coincidentally with a decrease in the cost of production. He points out that this policy has shown in this country wonderful results, and that it may be said to be in very truth the American policy in employment of labor. He enumerates some remarkable results taken from American watchmaking and cycle building, in which the highest summit of efficiency has been reached, bringing necessarily the lowest cost of production.

Typesetting machines, manufactured by the Linotype Company, are expensive machines, of which labor counts for 90 per cent. of cost. These machines being made with substantially the same machinery in Germany and in the United States it has been found that the American-made machines cost less than those in Germany, although labor in Germany is 40 per cent. cheaper than in America. A better instance could hardly be found than this. Possibly more striking, however, is the statement made by Mr. Outerbridge, the authority above referred to, that the cost of an American locomotive to day, finished and ready for use, is only a little over 6 cents a pound, or very little more than the cost of the raw material not a great many years ago.

Every one can draw his own conclusions from these things, but it is difficult to avoid the conclusion that there exists no possible reason why, under judicious effort, a growing and lucrative foreign trade may not continue to be enjoyed by the American maker of cycles and parts.—*The Wheel.*

THE London *Cyclist* says in a recent issue: "A prominent French journalist, who has been much concerned of late years with one of the Parisian cycling dailies, was on this side last week and gave it as his opinion, after careful study of the general features, that our cycle export trade with France was on the wane, before the persistent competition of the American houses established and to be established in France. Of the persistency, any one who has visited the Salon du Cycle must be aware. In past years the British has been the dominating foreign element in these shows, but to-day that has to be written of the makers from the other side of the Atlantic. As M. Bruel, the French representative of the Premier Cycle Company, assured us, the general French taste for cycles runs on American lines, and accordingly there are no prejudices to fight as there are here. Their way is made smoother for them by this fact and they are not slow to take advantage of it."

Many of the leading bicycle factories have already sent their new 1897 models to their principal agents abroad in anticipation of the increasing demand expected for next year's wheels.



### A New Hydrocycle.

THE very latest invention in the cycle line is a novelty which the inventor calls a hydrocycle, but to the mind of the ordinary person water bicycle would seem the most appropriate name. It is the result of the work of L. V. Moulton, of Michigan, and is unique and striking in many respects.

This newest hydrocycle bears as little resemblance to the earlier water cycles as a sailing ship does to a crack ocean liner. There is hardly any machinery, what little there is being of the simplest sort and easily repaired. There is no complicated system of cogs and shafts to confound the inexperienced navigator or make life miserable to the rider of the machine. Ball bearings make the work of running the machine very easy, and it shoots about on the surface of the water with little or no apparent exertion on the part of the rider.

It is so constructed that it can be used either for passengers or freight, and has a carrying capacity of 500 pounds. It is easily operated by one person, although there are accommodations on the machine for two.

The cycle is constructed on the catamaran principle, and is about ten feet long from end to end. The lower part of the machine consists of two long cylinders, pointed at each end. They are made of galvanized steel, and are held in position, side by side, about four feet apart, by strong steel rods.

At the stern of the two cylinders are placed two small steel rudders, operated by the rider of the hydrocycle by means of two rudder chains, which are connected with the steering gear, resembling an ordinary bicycle handle bar. Only about a third of the space between the two cylinders is covered. Placed on this zinc flooring, well forward, is a seat very similar in appearance to a light wooden chair, on which the passenger of the hydrocycle rides. Directly behind this seat is a seat for the driver of the machine. In appearance it is like the ordinary bicycle seat, while just below are the two pedals through which is furnished the motive power to the machine.

Directly back of the seat on which the driver of the machine sits is the wheel house, or, more properly speaking, the paddle box of the machine. This wheel house rises from the floor or deck of the hydrocycle and curves upward and backward, behind the driver of the machine, thus forming a perfect shield, which protects him from the spattering of the water from the wheel.

The wheel itself is a light steel framework of the style known as double. There are eight light steel paddle blades, made of galvanized steel, which strike the water alternately as the wheel revolves. The wheel is set in motion by a sprocket wheel between the pedals, in exactly the same way as does the sprocket chain and wheel on a bicycle.

This hydrocycle weighs 225 pounds, and when worked by one man can go through the water at the speed of ten miles an hour without undue exertion on the part of the driver. It is absolutely impossible to upset this craft or to sink her, owing to the fact that the two cylinders are airtight and are made in several compartments, so that an injury to one does not necessarily mean that the buoyancy of the craft will be in any way impaired.

This hydrocycle is on the water what the bicycle is on land. Its weight is not apparent when it is in the water, and the sharp-pointed cylinders move through the water with very little resistance. It will live on a sea which would instantly swamp an ordinary boat of its size. It can be turned in less than its own length, and draws but a few inches of water, even when carrying its entire capacity of weight.—*New York Herald.*

### The Construction of the Bicycle Wheel.

DID you ever look at the slender wire spokes of the bicycle wheel and wonder why they sustain so great a weight? This feature of the bicycle is a perfect piece of mechanism—both in principle and the delicate adjustment of the parts. The reason why so much weight is thus safely carried is that the hub is suspended from the rim instead of resting on the spokes, as in the case of the common wagon wheel. The weight of the rider is supported by the half of the rim that is uppermost, instead of pressing down against the lower half, thus calling only for tensile strength in the spokes. The high quality of the steel wire used for this purpose will enable it to withstand a heavy strain, and thus a very light and delicate-looking wheel results, with no sacrifice of strength or rigidity. It has been generally supposed that the suspension wheel is a new idea, and considerable interest has been taken in tracing its origin. It appears, however, that it is an old device. An English inventor used it in 1868, and a Frenchman adapted it to the two-wheeled velocipede in 1867. It also appears in the patent archives of Great Britain in 1826. But now it is ascertained that the invention of the suspension wheel antedates the discovery of America, and an actual sketch of the wheel with an autograph description has been found in the manuscript of Leonardo da Vinci. Another feature, puzzling to many, in the construction of the bicycle wheel is the way in which the spokes are fastened to the hub. Why do they shoot off on a tangent, crossing each other instead of going radially, or straight, from the hub to the nearest point of the rim? These tangent spokes, as they are called, are so placed to serve an important purpose. When the bicycle is being propelled the force applied to the hub has a tendency, on account of the resistance of the rim, to twist the hub forward and wind the spokes around it. This tendency is overcome by fastening the spokes to the hub flange in such a manner that the twisting is already done, and the pull on the spoke is lineal only.—*Progress of the World.*

An order for 1,000 cases of beer for Yucatan, Mexico, has been received. This is considered a good-sized order for that market, as for some years some breweries have been in operation in different parts of that republic.

### Items of Interest.

A Providence stovemaker is shipping large numbers of stoves to Norway. The Danish Consul says Americans have a good chance there.

Several orders have been received during the past month from Mexico for sugar machinery, chiefly the smaller sizes of cane-crushing mills.

Two carloads of shovels will be shipped from New York this month for Johannesburg, South Africa. They are in assorted qualities, from the cheapest to the medium grades.

It is reported that L. Goodman, of Nueva Leon, Mexico, has been awarded a concession for a street railway in Tampico and that he will soon be in the market for equipment material.

An order for three marine boilers of fifty horse power each has been received by an export commission house. They are to be shipped to the west coast of South America as quickly as they can be turned out.

A prominent safe manufacturer, with branch house in this city, has just received some very satisfactory orders from South America. Among them is a contract for a large specially built safe for a government bank.

Brick machinery manufacturers have cause to be satisfied with the export demand for their class of machinery. Lately a number of inquiries have been made, and within three weeks five complete plants have been shipped.

The Lawrence Machine Company, of Lawrence, Mass., U.S.A., have received orders during the month just past for a number of their improved centrifugal pumps for foreign shipments. Eleven were from Japan, four from Mexico, three to go to France and three to the island of Trinidad.

A laundry machinery company in Cincinnati made a shipment of their machinery to Glasgow and another to Johannesburg. Within the last six months a number of complete plants for laundry machinery have been put up in London and Hamburg by this company. They say the demand abroad for this class of machinery is constantly increasing.

It is reported by a Pittsburg varnish company that during December it made twenty-seven good-sized shipments of varnish to Europe. This company is planning to send a representative to Europe shortly, who will visit many of the leading manufacturing companies using varnish. If results are satisfactory, it is said, they will open a branch office in London.

A correspondent, writing from Paducah, Ky., says: "The largest order for lumber ever received by an establishment in this section recently came to McKinnie Veneer and Package Company. The order is for 900,000 feet of lumber, to be shipped to a big European firm. The order consists of 25,000 pieces, of which 500,000 feet are poplar and 400,000 feet oak."

On December 30th, there was a shipment made by New York parties to San Salvador on an order from the government of that republic. The shipment consisted of an entire portable railway, including track material and rolling stock. The principal items included twenty-one cars, freight, passenger, etc., and an iron portable house, which is to be used as a shop or store for the road.

The London correspondent of the *New York World* cabled that paper on January 3d as follows: "The London County Council has just declined to ask for bids from American firms to furnish steam fire engines. The suggestion, I see, was received by the Council with a howl of disapproval." Yet I have been told by competent judges here that comparisons between the excellence of the American engines and their equipment, the speed and discipline of the firemen are entirely in favor of America.

Peter Gerlach & Co., Cleveland, O., last month made a shipment of two carloads of machinery for Tokio, Japan, a complete plant for bridge-sawed staves, sawed heading and hoops, as well as improvements in finishing and setting up machinery for making 1,000 nail and spike kegs per day; value, \$6,000. They are also working on an order for butter tub machinery for Dublin, Ireland. An additional order for stove and heading machinery for oil barrels was furnished the Austrian Steam Cooperage Company, Galecia, Austria.

Four large cranes made by a Muskegon, Mich., company are now on the way to their destination at Mariopol, Russia. Six big flat cars were required to carry the material. The cranes were made for the Mariopol-Nicopol Mining and Metallurgical Company, and are a part of the equipment being supplied from this country for the big manufacturing plant being built by European and American capitalists near the city of that name, the plant to include open-hearth steel furnaces, rolling mills, locomotive works and general machine shops.

Recently orders for machinery for printing cotton cloth have been received from Mexico. Lately the exports of prints to Mexico have fallen off a great deal, owing to the fact that a number of print mills have been established there. The machinery for such mills is mostly of English manufacture. In textile machinery generally the English manufacturers continue to lead the world, and in this line their superiority must be acknowledged. In some special lines the American manufacturers are gaining rapidly upon their foreign competitors.

It is claimed that aluminum plates are destined to become the universal material for lithographic printing, which means a revolution in the lithographic art. Of all the metals that have been tried besides aluminum, says the *Aluminum World*, to replace the cumbersome lithographic stone, zinc is the only metal which has given any satisfaction, but it was found that zinc could not be depended upon. To insure good work the zinc plates must be absolutely pure, and even then many colors cannot be printed from zinc with safety. Aluminum has been proven to be as good as stone. The metal approaches the physical properties of lithographing stone from its ability to absorb fats or slimy substances.

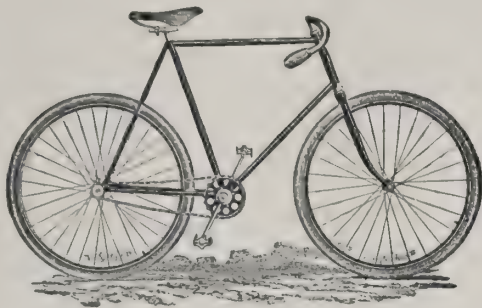


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### A Novel Sleeping Car.

IN the private car of the vice-president of the Pittsburg and Lake Erie Railroad a new idea has been introduced. The cushions of the chair seats used during the day are inflated with air.

During the day no one would for a moment suppose that he was riding in a sleeping car, and it is not until the day coach is transformed into a sleeper that the possibilities of the use of compressed air in this direction are fully realized.

The transformation is effected in this wise: First, the air in the cushions is exhausted, the light framework folded up and slipped into an opening in the side of the car. Thus all the seats in the car are disposed of and it is ready for the beds.

The panels on either side of the windows open outward like a door. On the inside of these panels is a metal track, over which is drawn a steel spring-like arrangement which supports the bed. Fitting closely against the side of the car and concealed during the day by the closed panels is a rubber bag folded after the fashion of an accordion.

By turning a valve connected with a storage tank beneath the car compressed air is admitted into the rubber bag, which inflates and forces itself outward from the side of the car until it rests upon the steel framework, and the bed is ready to be made up. The head and foot of the bed are panels, which also fit into the side of the car.

### A Duplex Street Car.

THE change from closed to open cars and vice versa, to suit the temperature of the season, is often a great burden to street railways, necessitating almost double equipment of rolling stock. The duplex car is designed to meet this difficulty, as it can in a moment be changed from a comfortable closed car of pleasing appearance to an open car of the most modern style. The windows are of curved glass, and each section of the side slides up under the roof, and at the same time a running board is dropped down at the sides, giving the car the appearance of those ordinarily used in the Summer season. This car has been on trial for some weeks on the lines of the Concord (N. H.) Street Railway, and has given abundant satisfaction.

The advantages are very apparent for seaboard cities, where the cool nights and mornings call for closed cars, while open ones are desired in the warmer part of the day in Spring and Autumn.

### Foreign Trade Statistics.

AN excess of exports of merchandise rarely equalled in the commercial history of the United States is the record afforded by the month of October as the result of the restriction of business at home and the demand for American products abroad. The exports of the month were \$113,385,497, or at the rate of more than \$1,350,000,000 per year, while the imports of the month were only \$50,373,675. The excess of exports over imports was \$63,011,822, or more than the gross imports of the month into the United States. The effect of these figures upon the record for the ten months of the calendar year is to convert an excess of imports for the corresponding month of 1895 amounting to \$31,105,045 into an excess of exports for 1896 amounting to \$206,985,483. The change in the character of the trade balance is, therefore, more than \$238,000,000, or more than 40 per cent. of the whole volume of imports for the past ten months of 1896.—*Mercantile and Financial Times*.

### A Mile of Gold Fountain Pens.

BLAIR'S FOUNTAIN PEN COMPANY, New York, have just completed an order for 10,000 gold fountain pens (mostly for export) the largest order ever given for this line of goods taken in competition with eight manufacturers.

These pens with the cap on the upper end ready for use if laid end to end would extend a distance of 5,280 feet or a statute mile. The gold pens in them if placed the same way would reach a distance of 725 feet or more than the length of two city blocks. It took 375 feet of gold tubing to mount the pens or more than the length of an ordinary block.—*Jeweller's Circular*.

ARTHUR DE CIMA, United States Consul at Mazatlan, recently arrived in San Francisco. He is the owner of the electric-light plant and telephone system in Mazatlan. His electric plant has a capacity of 1,500 lights, but as many more are needed he will make arrangements for extra electric supplies while in the United States. He will also get extra supplies for his telephone system. There are 100 telephones in the system now, but more are required. He has a franchise for putting in an electric street-car system in Mazatlan, and has come, it is reported, to get about \$40,000 worth of cars, rails and other apparatus.

—The Government of New South Wales is advertising for bids for 150,000 tons of steel rails, fish plates, spikes and other material for its own railroads.

—At one of the piers in New York there is a vessel in transit, boxed for shipment in separate pieces, for South America. The vessel has been built at Lewis Nixon's shipyard and is to be used on the Magdalena River in Colombia. Her length is 100 feet, beam 22 feet, depth 7 feet, and she carries 100 tons of cargo on 3-foot draught. She is propelled by independent side wheels, driven by compound engines.

### Patent Medicine Making.

THE proprietary medicine industry in America is attaining large proportions. So important a branch of the drug trade has it become that a special committee has been placed in charge of that interest by the National Wholesale Druggists' Association, and its acts have been closely watched by the trade of the country for some years past. Exclusive of those connected with the advertising department, a numerous branch, and the stockholders in such of the concerns as are incorporated, 10,000 men are engaged in the patent medicine manufactories of the United States, receiving collectively more than \$4,000,000 a year in salaries and wages. There are 850 such manufactories, ranging in importance from those which flood the American and foreign market with proprietary medicines, as they are technically called, down to the small laboratories, or botanist shops, in which some particular herb or root is, in a grudging and primitive manner, supplied to such persons as may have heard of its efficacy.

In the East New York leads as a patent medicine manufacturing centre; Philadelphia comes next, New Haven third and Lowell fourth. In the West Chicago and St. Louis lead; then come Cincinnati, Grand Rapids and Peoria in the order named.

Statistics presented from time to time show that the exportation of American patent medicine is increasing, but the manufacturers continue, nevertheless, to appeal with the greatest confidence to the home market.—*Paint, Oil and Drug Review*.

### General Notes.

—In 1895 a company built a large aluminum plant at Niagara Falls, and this year it is building additional works. When these are completed they will have an output of 11,000 pounds daily. This will put the United States in front as the largest aluminum-producing country in the world.

—At the last meeting of the board of directors of the Bloomsburg Car Manufacturing Company, Bloomsburg, Pa., L. S. Wintersteen was made president. Like most concerns at present, the home demand is limited, but the works are kept busy filling orders for Japan and South America.

—Several thousand men in New York make living wages manufacturing doll carriages for the export trade. The best sell for \$16 and the cheapest for 25 cents. Seventy per cent. of the total output is exported to South America, Australia and the United Kingdom. There are thirty-one different styles.

—The complete equipment for a railroad 30 miles long will soon be shipped from this port to Puerto Rico. An English corporation are the owners and operators of said road. The equipments have been furnished by Messrs. H. C. Dayton & Co., export agents for the Bloomsburg Car Manufacturing Company, of Bloomsburg, Pa.

—Considerable shipments of street brooms, of the type familiarly seen in the streets of New York City, with the scraper attachment, have recently been made to Hayti, Port Limon and Sydney, Australia. These are said to be the first shipments of street cleaning implements from the United States, the demand having hitherto been supplied by Great Britain and Germany.

—A can opener has been recently invented by Lyman W. Merriam, of Fitchburg, Mass. At the point of jointure of the cover and can a channel is sunk, in which is soldered an annealed wire, the end of which is left projecting sufficiently to be grasped when the can is to be opened. A slight pull removes the wire and releases the cover, leaving the can intact for use again.

—An important consular report has just been received from Consul Monaghan of Chemnitz, Germany, in regard to the Credit Protecting Union, which not only does original work in its own way, but supplements the work of commercial agencies in this country. Consul Monaghan says that he has had occasion to study the usefulness of this union and finds it one of the best possible systems.

—The *Journal of Commerce* says: "A leading engine builder of Milwaukee has lately received an order from the Austrian Government to build two large blowing engines of the same type as those used at the Carnegie Steel Company, of Pittsburg, Pa. According to reports that government contemplates building and running steel works modelled after the American style. The engines ordered, when completed, will weigh over 600,000 pounds each."

—The Russian Prince Hillkoff, when in Philadelphia recently, said that he had placed an order for 18,000 American railroad watches, which will be given to the employees of the Russian railroads. The railroad men are supplied with timepieces free of charge in the country of the Czar. Orders for various American railroad devices will be placed in this country by the Prince, as he has expressed admiration for many of the American patents in that line.

—As a result of the final tests of machine guns at the Washington Navy Yard recently, the Department decided that the new Colt gun is to be used exclusively on war ships. This gun fired four hundred shots in fifty-three seconds, and subsequently discharged two thousand one hundred and eleven consecutive rounds before overheating—a better showing than was made by the Maxim and Hotchkiss weapons. Fifty of the new guns have already been ordered for the Navy.

—A dispatch from Rockford, Ill., states that M. W. Marsden, E. A. Corbin, W. W. Gibbs and other Philadelphia capitalists, constituting the Marsden Development Company, have purchased in that city the plant of the Rockford Folding Bed Company, and will establish a new manufactory there of a food product derived from cornstalks. The company puts \$60,000 into new machinery, and will give employment to 150 workmen. Mr. Marsden will be remembered as the inventor of the cornstalk plth packing, adopted by the navy in the construction of war vessels.





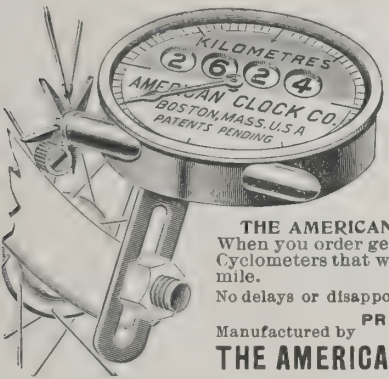
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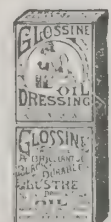
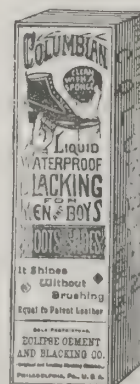
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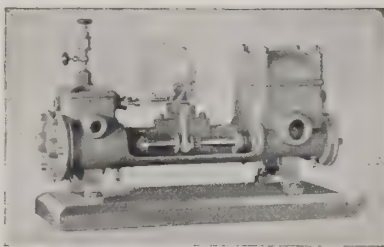
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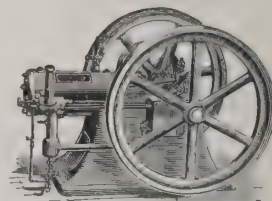
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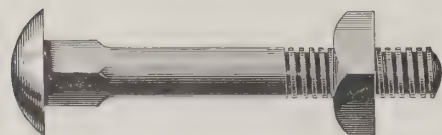
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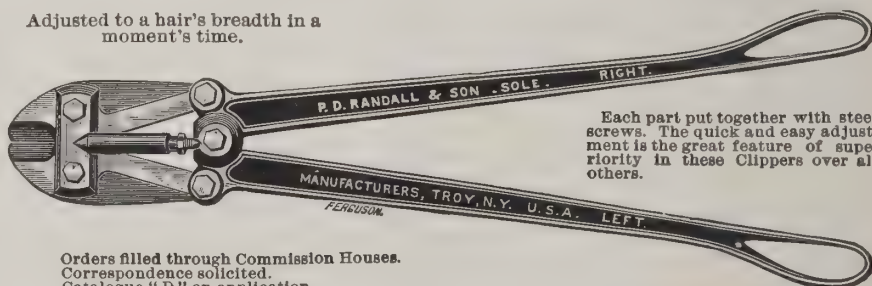
## RANDALL'S NEW VALVE ADJUSTING BOLT CLIPPERS.

No weak spots in the whole Clipper. Knives tempered in the most careful manner. Every Clipper thoroughly tested before it leaves our factory. No. 3 cuts 3/8 inch or less. No. 4, 1/2 inch or less. No. 5, 3/4 inch or less.

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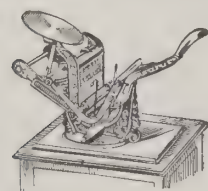
P. D. RANDALL & SON, - Troy, N. Y., U. S. A.

Adjusted to a hair's breadth in a moment's time.



Each part put together with steel screws. The quick and easy adjustment is the great feature of superiority in these Clippers over all others.

Orders filled through Commission Houses.  
Correspondence solicited.  
Catalogue "D" on application.

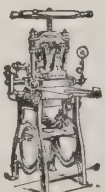


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With Outfits  
from \$1.00 to \$100.00 each.

Sales 1895, 15,000 Presses.

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## Rubber Stamp Vulcanizers, Steam and Dry Heat, with Outfits.

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ALL TOOLS AND SUPPLIES FOR STAMPS AND STENCILS.

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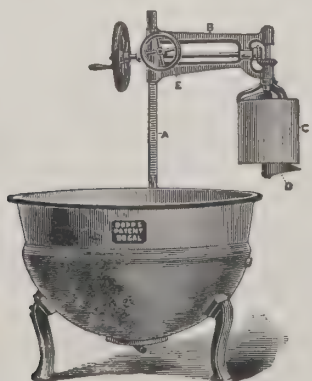
The Leading House.

## H. WM. DOPP & SON,

MANUFACTURERS OF

Soap Makers' and Butchers' Machinery,

462 Ellicott Street, Buffalo, New York, U. S. A.

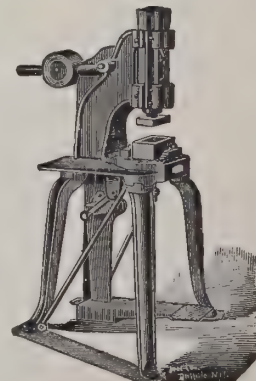


Swing Foot Lever Soap Presses, Nos. 1 and 2. Combination Foot and Steam Power Soap Presses. Improved Soap Remelting Catchers, either with or without 8 Horse Power Engine attached. Seamless Steam Jacketed Kettles. Steamed Jacketed Toilet Soap Kettle, with Agitator (three different styles). Steam Jacketed Rendering and Refining Kettles.

Improved Lard Dryer, Mixer and Cooler. Steam Jacketed Vacuum Pans, Hotel Kettles for Boiling and Steaming in Hospitals, Institutes, Barracks, Hotels, Asylums, &c. Steam Jacketed Glue Pot Heaters. Iron Soap Cutting Frames, with Adjustable Wires. Soap Dies, for Stamping and Moulding the Soap. Hand Stamps, Steam Traps, with Balanced Valve, &c.

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TIPPED TEA SPOON, HALF SIZE.

The above cut represent our  
INLAID SILVER BEFORE PLATING.

RIALTO TEA SPOON, HALF SIZE.

Send for Illustrated Catalogue and Price List. Made only by

**THE HOLMES & EDWARDS SILVER CO., Bridgeport, Conn., U. S. A.**

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## Johnston's Standard Kalsomine and Fresco Paints,

Ready for Use!

FOR WALLS AND CEILINGS.

Absolutely Reliable!

GOLD MEDAL, NEW ORLEANS, 1884-5.

EIGHT FIRST-CLASS AWARDS.

**Cheaper than Wall Paper or Oil Paint.**

Pure White and Beautiful Tints. Will not rub or scale from the wall. Invaluable in cleansing and disinfecting walls impregnated with germs of disease. Mixed in five minutes ready for the brush, by the addition of water only. Five pounds will cover with a good body 500 square feet on hard-finished walls. Send for sample card and prices to

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3/4 of Full  
Size, Open.**BLAIR'S SECURITY FOUNTAIN PENS.** THE VERY BEST. Non-Leakable. Regular Shape Gold Pen. Moderate Prices. A Guarantee for 1 Year.**THE JOHN BLAIR  
COLD PENS.**

WARRANTED 14 K

Long and  
Stub  
Points.

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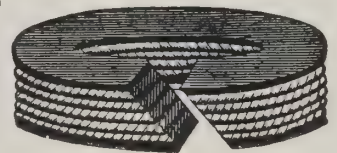
IN ORDERING, GIVE EXACT DIAMETER OF STUFFING BOX AND PISTON ROD OR VALVE STEM.  
**SELF-LUBRICATING, STEAM AND WATER TIGHT.**

Less friction than any other known Packing. Never grows hard if directions are followed. Does not corrode the rod. EVERY PACKING FULLY WARRANTED.

N. B.—This packing will be sent to any address, and if not satisfactory after a trial of 30 days, can be returned at our expense. None genuine without this trademark and date of patent stamped on wrapper. All similar packings are imitations and calculated to deceive.

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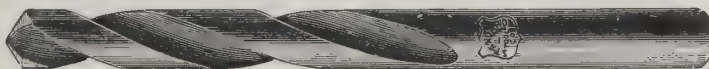
ORIGINAL RING PACKING.



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## The STANDARD TOOL COMPANY, Cleveland, Ohio, U. S. A.

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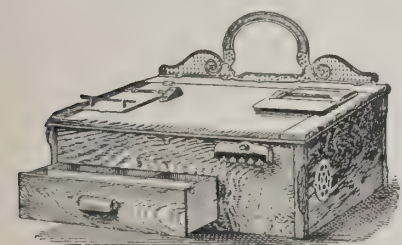
**Increase Twist Drills.**

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Bit Stock Drills for Metal or Wood, Taper and Straight Shank Drills, Reamers, Sockets, Chucks and extra length drills for Electrical work.

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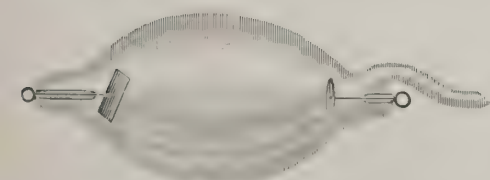
But that is no reason for not watching every dollar that is taken in and paid out by you and your clerks. Indeed, these are times when you can least afford not to have a cash system for keeping track of the business you are doing. Our Recorder will do the work of a cashier whose salary for six weeks will pay the entire cost of the machine, freight included. Absolute protection against FORGETFULNESS.

Write us for  
Circular.**HOUGH CASH RECORDER CO., Indian Orchard, Mass., U. S. A.**

Twist Drills made by this Company are HOT FORGED by an Entirely New Process.

They are **TOUGHER** and **STRONGER** than the OLD STYLE Milled Drills.Catalogues sent free  
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Taper Shank Drills,  
1/4 inch " "  
3/8 inch " "  
Drills, fitting ratchets  
Etc.

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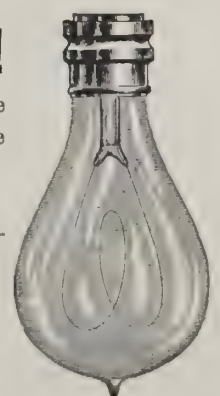


We make tubes of all the different designs, and as we test each tube before it leaves the factory, we can guarantee them to be first quality in every respect, and unexcelled by any tubes made.

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We manufacture a full line of standard and miniature incandescent lamps, 1/2 to 300 c. p., for all systems. We can guarantee them to be of the highest possible grade and to give undoubted satisfaction in service.

Special attention to export trade, and special discounts on large orders.

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Sole Manufacturers of the  
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## PRESSED WOOD ORNAMENTS.

250 Various Designs and Sizes. 10 kinds of Wood. From  $\frac{3}{4}$  in. to  $4\frac{1}{4}$  in.,  
round and square, and from  $2\frac{3}{4} \times 3\frac{1}{4}$  in. to  $3\frac{3}{4} \times 15\frac{1}{4}$  in. oblong.

HARDWOOD FINISH AND VENEERED OAK  
DOORS A SPECIALTY.

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1,000,000 pieces, comprising a full assortment, al-  
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4 MACHINES OPERATING.

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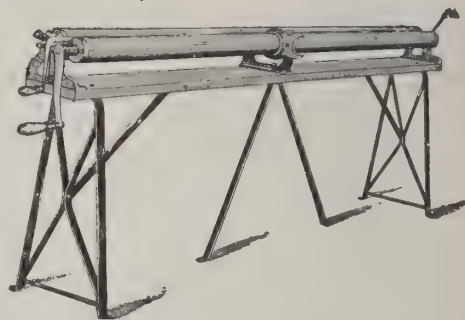
## To the Foreign Sheet Metal Trade and Buyers of Sheet Metal Working Machinery:-

We desire to call your attention to our system of slitting Sheet Metal and forming the same into  
EAVES TROUGH, which is so largely used throughout the United States.

The CAPITAL ROTARY SLITTING SHEARS are designed to cut sheet metal into strips for form-  
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are required. The machine is furnished with two or more sets of  
cutting disks, which are adjustable to any width desired, and will  
cut a whole sheet of metal, 30 inches wide, into strips of any de-  
sired width. The CAPITAL GUTTER FORMER is adapted to  
form Eaves Trough from 3 to 8 inches wide from sheet metal  
strips 8 and 10 feet lengths, and has a capacity of 800 feet per  
hour, with two ordinary men or boys.



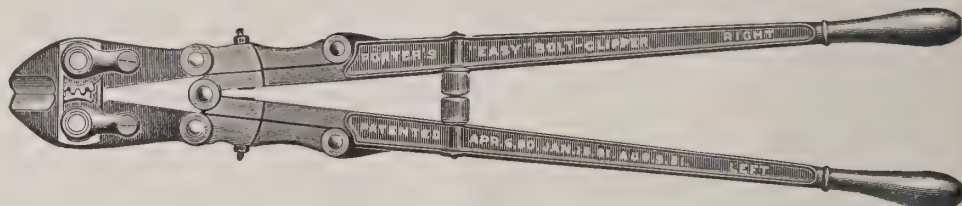
For further information  
and prices, address



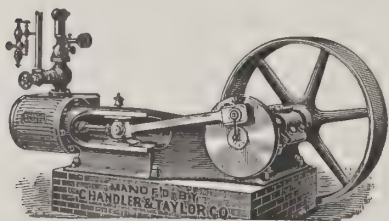
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MANUFACTURED BY



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STRONG.

WELL BUILT.

SERVICEABLE.

## STEAM ENGINES.

12 to 100 Horse Power. Suitable for Heavy Continuous Work. Every Engine TESTED  
under full load.

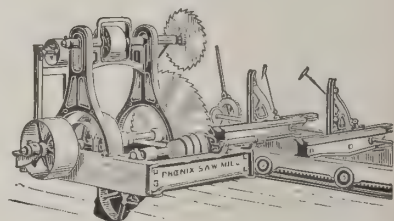
Suitable Portable and Stationary BOILERS

On hand for immediate delivery.

CIRCULAR SAW MILLS for all classes of work and MULAY MILLS for Light Power.

Send for Circular "C."

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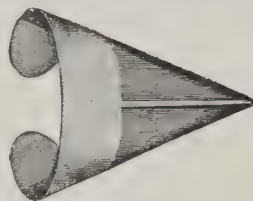


ESTABLISHED 1872.

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93 Centre Street, BROCKTON, Mass., U. S. A.



Manufacturers of LADIES' and GENTS'

## BOX TOES

Moulded Forms for  
Toes of Boots and Shoes.

OF ALL STYLES IN LEATHER AND LEATHER BOARD,  
AND COMBINATION LEATHER.

Flexible Leather Boxes a Specialty. A Perfect Fit Guaranteed. Send a  
Last for Sample Lot, or Wooden Model showing Toe of Last.

## GUARANTEED TO CURE DIPHTHERIA: THOMPSON'S DIPHTHERIA CURE.

Not only prevents and cures Diphtheria, but is an infallible remedy for all affections of the throat.  
It is a family friend that households should never be without.

If administered according to directions it never fails to cure. Harmless if taken internally.

THIS REMEDY IS PREVENTIVE AS WELL AS CURATIVE,

and CURES DIPHTHERIA, GROUP, SORE THROAT, QUINSY, Etc.

Call at your dealer's or enclose stamp for full particulars to the manufacturers.

THOMPSON DIPHTHERIA CURE CO., WILLIAMSPORT, PA., U. S. A.

The Only Remedy That  
Positively Cures Diphtheria.

THOMPSON'S  
DIPHTHERIA  
CURE.

Guaranteed to Cure.  
Unfailing Certainty.

50c AND \$1.00 PER BOTTLE

Manufactured by

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## CROSBY STEAM GAGE AND VALVE COMPANY,

MANUFACTURERS OF

## Standard Steam Appliances.

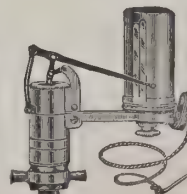
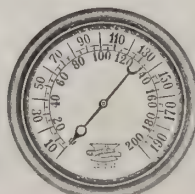
Awarded the GOLD MEDAL at Paris, 1889.

Crosby Pop Safety Valves and Water Relief Valves,

Crosby Improved Steam Gages, Single Bell Chime Whistles,

Catalogue No. 7  
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93 & 95 OLIVER STREET, BOSTON, MASS., U. S. A.



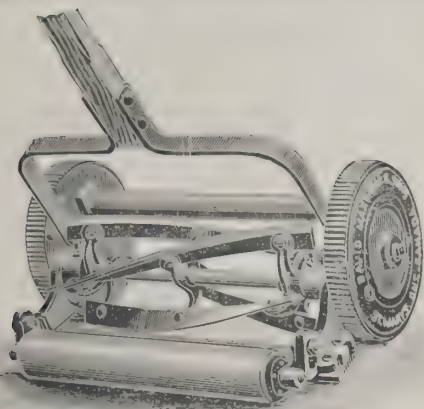
Safety Valve.

Water Relief Valve.

Steam Gage.

Indicator.





## MAXWELL LAWN MOWERS.

HIGH AND  
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The Latest and Most Perfect in the Market.

## IMPROVED FARM MACHINERY of all Descriptions.

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Manufacturers,  
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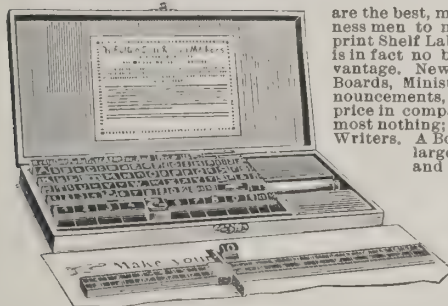
## EMERY and Corundum Wheels, Cylinder and Cup Wheels, Grinding and Polishing Machinery and Supplies.

We manufacture the highest grade of Emery and Corundum Wheels, using best stock, and all goods are guaranteed unsurpassed in the world. They are open and porous and do not gum or glaze over. We make every size and style known and are prepared to quote close prices to buyers. Write and tell us what you can use and we will be pleased to give full information regarding our goods.

## BUFFALO EMERY WHEEL CO.

18 LOCK STREET, BUFFALO, N. Y., U. S. A.

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are the best, most complete and cheapest outfits for Business men to make their own Show and Price Cards, to print Shelf Labels, mark Boxes, Barrels, etc., etc. There is in fact no business where they cannot be used to advantage. Newspapers are using them for their Bulletin Boards, Ministers for Church Notices, Theatres for Announcements, Restaurants for Bills of Fare, etc. Their price in comparison to their usefulness amounts to almost nothing; it saves the cost of Sign Painters and Ticket Writers. A Boy can do all the lettering required in the largest Department Store. They last a lifetime and can be used for every language. We have

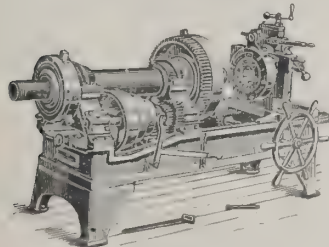
50 DIFFERENT STYLES

to select from in sizes from 1-2 to 4-inch letters. Goods can be had through any commission house or sent by Parcel Post. For Catalogues, etc., address

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Builders of  
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Peerless  
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Pipe-Threading  
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Peerless No. 4 Improved Expanding  
Dies for 1-inch to 4-inch Pipe.



Continuous Feed  
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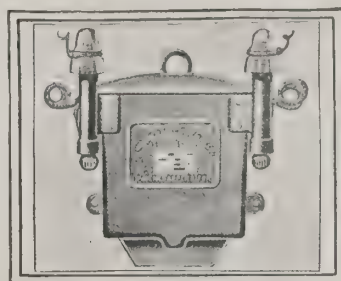
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## STEAM RIDING GALLERY.

Twenty four galloping horses (twelve pairs)—each horse has an easy galloping motion—four chariots, with seating capacity for fifty six persons. Easily taken down and transported on cars or wagons. Three men can take it down in two hours. Each piece numbered.

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NORTH TONAWANDA, N. Y.,  
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The gallery includes portable engine, automatic organ, image, tents, poles, etc., complete.



NOT the CHEAPEST to Buy

BUT the CHEAPEST to Operate

We have courted and ENCOURAGED

COMPARATIVE TESTS, knowing that our Competitors alone had cause to fear them

REMEMBER, EFFICIENCY AFFECTS YOUR COAL PILE

The Cheapest Transformer is sure to prove the most expensive in the end

## WAGNER ELECTRIC MANUFACTURING CO

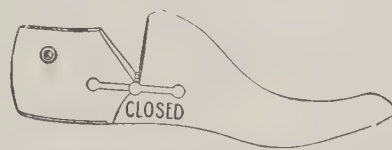
GENERAL OFFICES AND FACTORY, ST. LOUIS, U.S.A.

WHEN WRITING US MENTION "THE AMERICAN EXPORTER."

## THE BROCKTON LAST CO.

BROCKTON, MASS., U. S. A.

Manufacturers of Fine Shoe Lasts.



Makers of the Celebrated Patent Hinge Lasts, outlined by above cut. We are making a specialty of Fine Shoe Lasts, men's and women's, for the foreign trade. Correspondence solicited. Send for full particulars and prices.

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MANUFACTURERS OF



## WOOLEN MACHINERY,

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FIRST BREAKER WOOLEN CARD  
NUMBER 3.

WRITE FOR NEW CATALOGUE.

## Superior Box Nailer,

Built in the Most Substantial Manner.

SIMPLE. Can be used for DURABLE.

FRAMING, BOTTOMING,

Or Any Other Kind of Work.

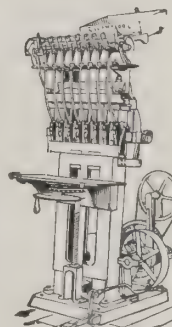
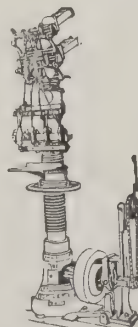
No weight or spring on treadle to tire the operator. Will nail cigar and other small boxes. Bottoms can be nailed on in two revolutions.

This machine will nail plug tobacco boxes, caddies, and also the linings in same. It will also nail sunken and battened boxes, boxes with both ends even, lock cornered boxes, boxes with one end even and one end sunk, or any other description of boxes; and it will nail automatically in the center of any thickness of stuff. Nails can be driven straight, zigzag, or otherwise.

For full particulars address,

WM. S. DOIG,

24 Franklin St., Brooklyn, N. Y., U. S. A.



## THE "UTICA" GAUGE

Has been in the market over 35 years.

SIMPLE, DURABLE,  
ACCURATE.

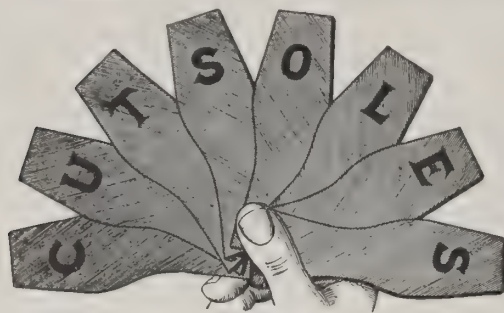
Circulars and Prices on Application.

UTICA STEAM GAUGE CO.,

100 & 102 La Fayette St.,

UTICA, N. Y., U. S. A.





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LYNN, MASS., U. S. A.

Manufacturers and Exporters of

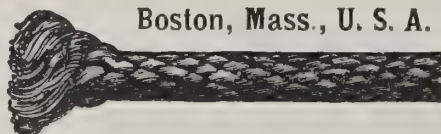
### Women's Cut Soles and Leather.

Orders filled through commission houses.  
Correspondence solicited.

Price Sheet "D" on application.

## SILVER LAKE COMPANY, THE ORIGINAL MANUFACTURERS OF Solid Braided Cordage.

WINDOW SASH CORD, } COTTON, LINEN OR  
RAILROAD BELL CORD, } ITALIAN HEMP.  
ARC LIGHT AND TROLLEY CORD.



Boston, Mass., U. S. A.

THE BEST IS THE CHEAPEST.

CLOTHES LINES,  
AWNING AND MASONS' LINES,  
CHALK LINES, ETC., ETC.

Send for Samples.

STEAM PACKINGS. SILVER LAKE & MILLER SOAPSTONE PACKING.

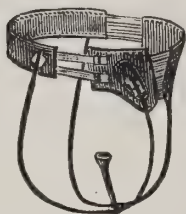
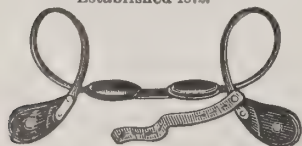
Send for Samples.

## THE HASTINGS & McINTOSH TRUSS CO.,

Established 1872.

Successors to  
THE HASTINGS TRUSS CO.

224 SOUTH NINTH STREET,  
PHILADELPHIA, PA.,  
U. S. A.



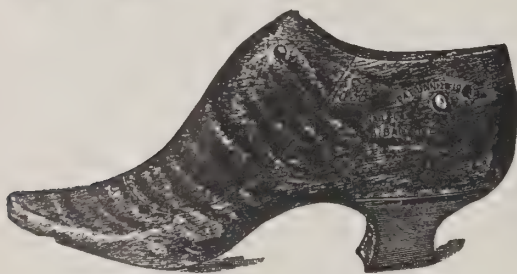
## Manufacturers of all kinds of Indestructible Hard Rubber, Elastic and Leather-Covered TRUSSES,

Abdominal and Uterine Supporters, Shoulder Braces, Crutches,  
Elastic Hosiery and Body Belts.

For Home and Export Trade.

Sole Makers of the CELEBRATED DR. McINTOSH NATURAL  
UTERINE SUPPORTERS.

We solicit orders through export commission houses.  
Send for Catalogue and Price Lists.



## DAYTON BALL & CO., - Albany, N. Y.

MANUFACTURERS OF

U. S. A.

### FINE LASTS.

Send for Price Sheet "B."  
Orders filled through Commission  
houses.  
Correspondence solicited.

WARREN & STRANG,  
SYDNEY, AUSTRALIA,  
Agents for Australia and New Zealand.

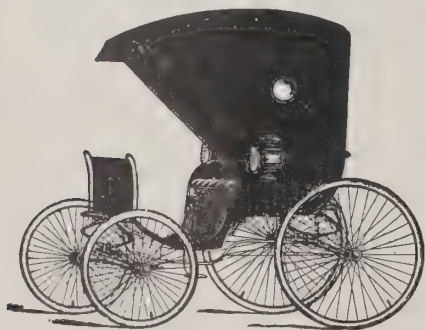
## WHY IS IT that we build more Phaetons for export than all other factories combined?

### REASON:

We build PHAETONS exclusively.  
We study points of excellence in this one class of vehicles alone.  
We get the cost down to a right price—a surprisingly low price when real merit is considered.  
We use such care in the packing and casing of our goods that transportation charges are reduced to the minimum.

### RESULT:

Low prices for best Phaetons built  
Send for our illustrated booklet and prices on different styles.



ONE OF OUR STYLES.

Address SALES DEPARTMENT.

**THE COLUMBUS PHAETON CO.**  
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## The Steam Merry-go-round is a Great Money-Maker.

Affords delightful amusement for old and young.  
Attractive and simple in construction and operation.  
Complete outfit, seating 56 people, with galloping horses, chariots, organ, engine and boiler, ample tent.

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## THE PARKE PENDANT BURNER.

SIMPLE IN CONSTRUCTION.  
RELIABLE IN OPERATION.  
ABSOLUTELY SAFE IN USE.

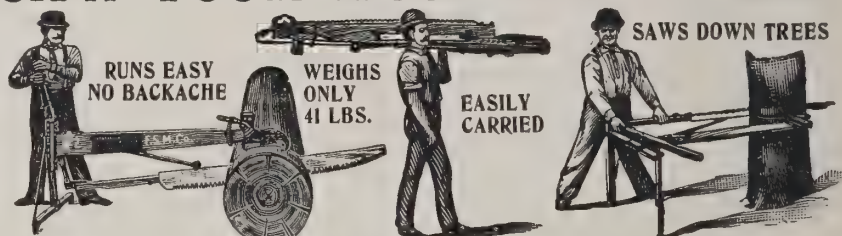
Contains fewer parts than any other valve burner, is carefully made of the best materials and fully guaranteed. The cheapest and best electrical gas lighting burner yet produced. Upward of 100,000 now in satisfactory operation. Price, including pendant pull, brass finish, \$0.85; nickel finish, \$1.00. Pendant and Automatic Argands and Candles, Billiard Burners, Gas Lighting Keys, Insulating Bushings, etc. Testimonials on application. Liberal discount to the trade.

Manufactured by

**JOHN Y. PARKE & CO.**

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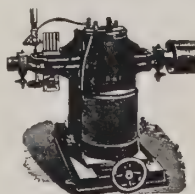
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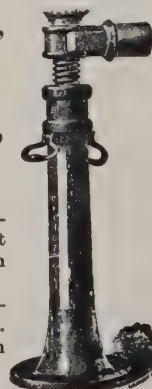
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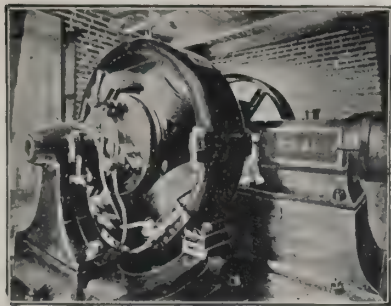
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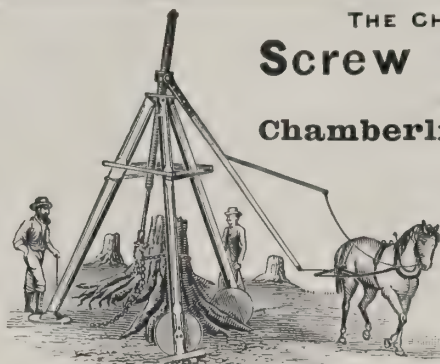
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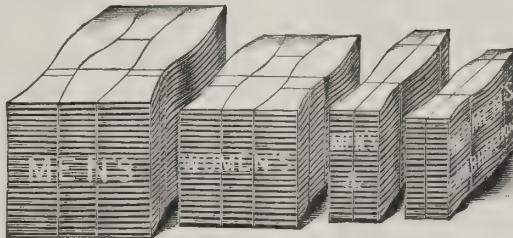
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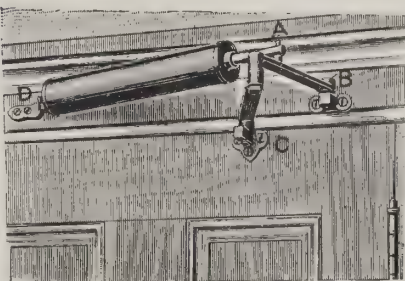
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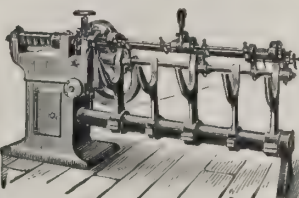
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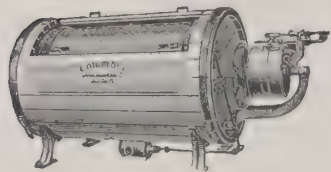
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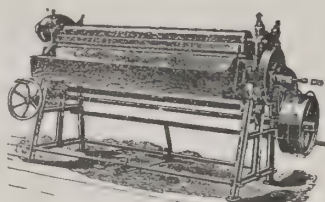
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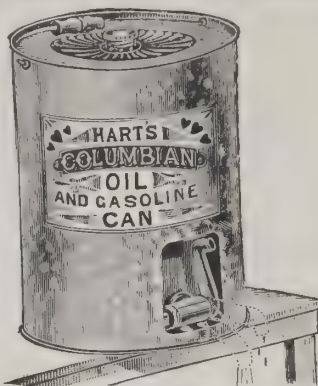
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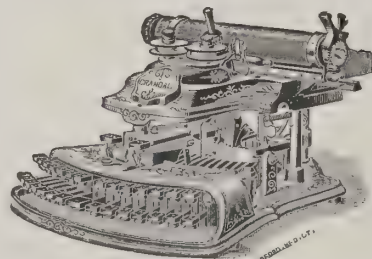
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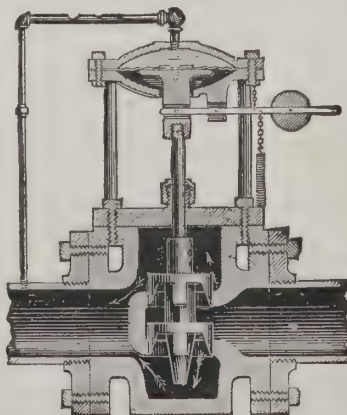
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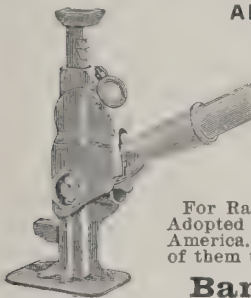
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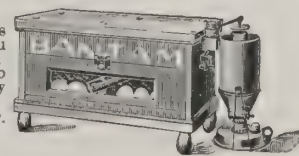
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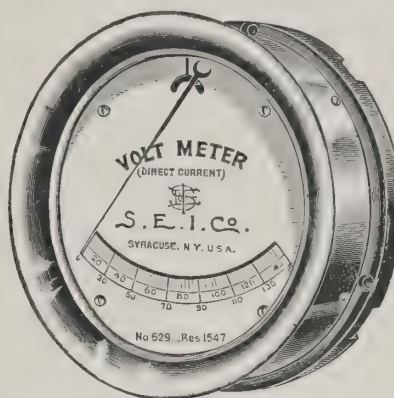
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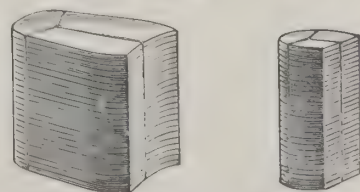
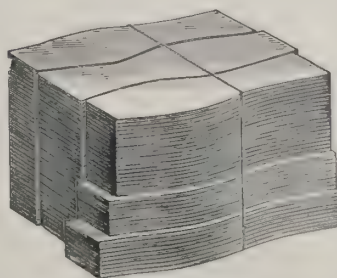
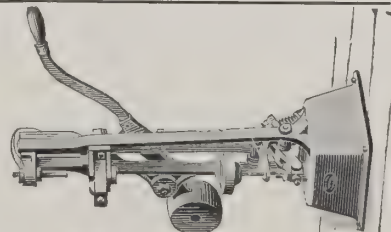
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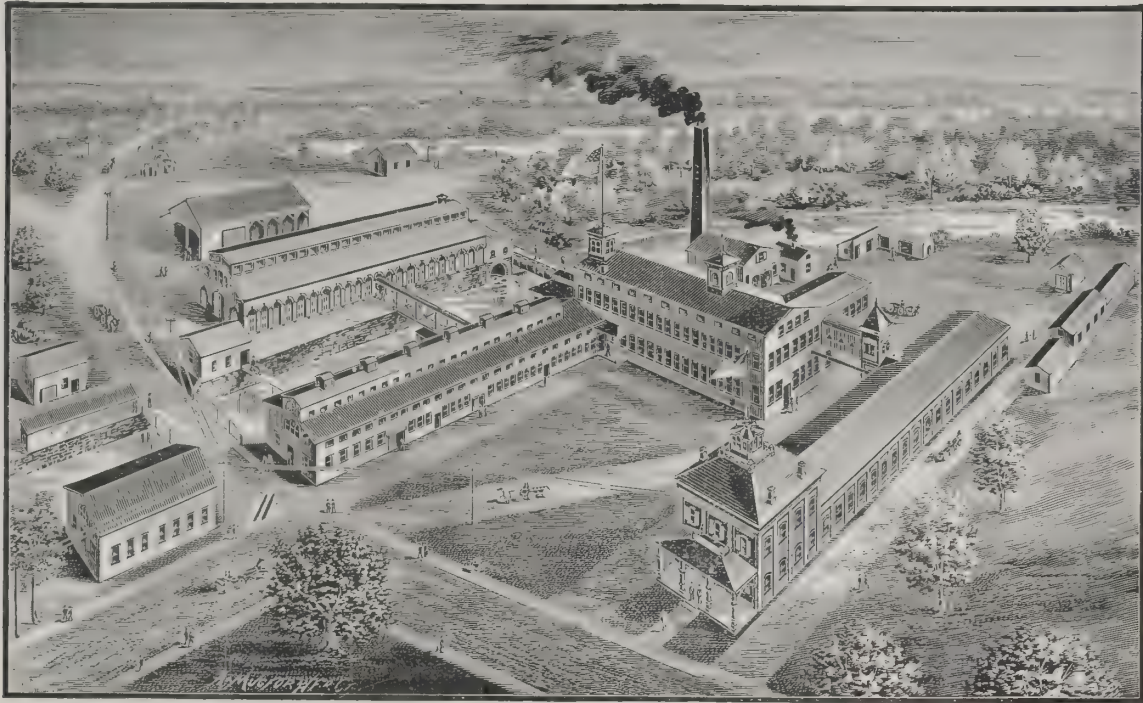


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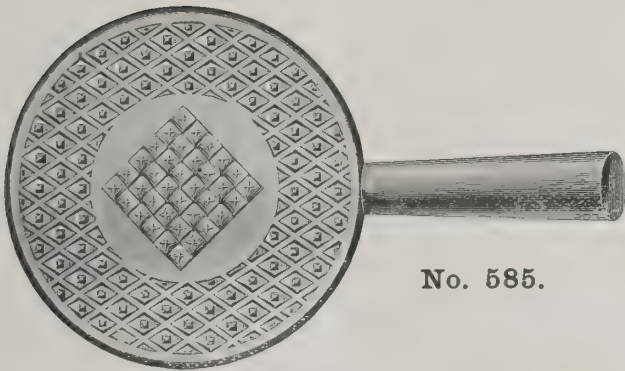
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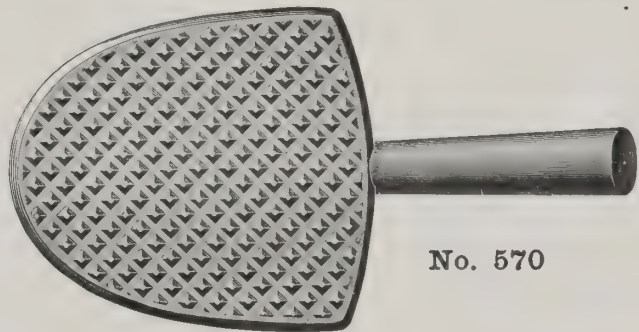
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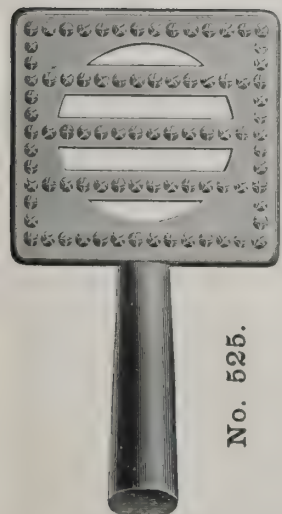
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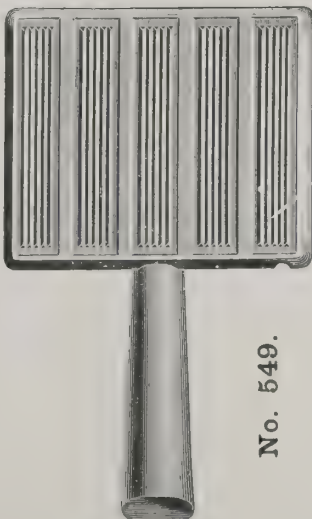
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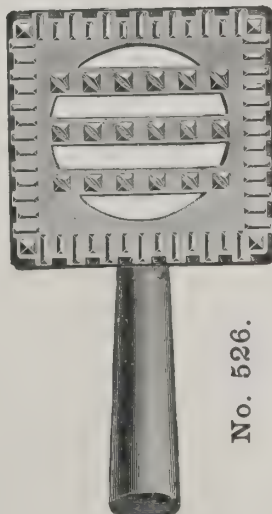
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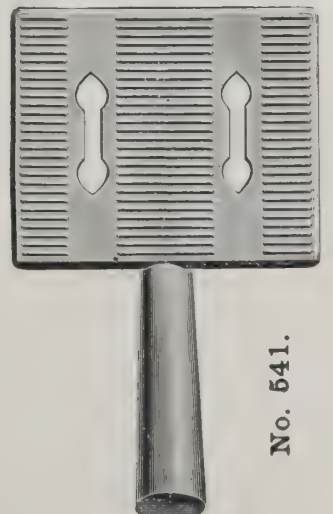
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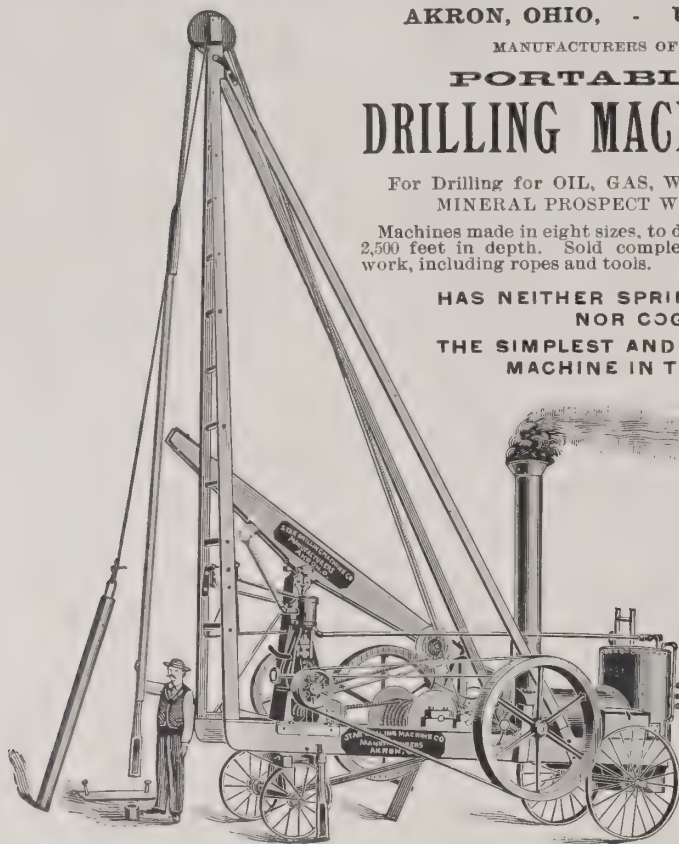


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Knife, \$8 per doz.; Novelty Pocket Screw Driver, \$4 per doz.; Artists' Rotary Kit, \$5 per  
doz.; Self-Locking Door Indicator, \$2.50 per doz.; Madame Louie Hair Crimper, \$2.50 great  
gross; Novelty Stitched Hair Crimper, \$1.50 great gross; Automatic Fisher, \$1.50 per doz.;  
Automatic Towel Holder, \$1 per doz.; Suspension Gas Wrench, 60c. per doz.; Novelty Skein  
Holder, \$4.80 per doz.; Keyring Door Securer, \$1.50 per doz.; American Mincing Knife, 1, 2  
and 3 blades, 75c., \$1.25 and \$1.75 per doz.; The Masticator, \$1.75 per doz.; Duplex Can  
Opener, 30c. per doz.; Universal Wardrobe Shelf Bracket, \$1.50 per doz.; Double Match Box  
Bracket, \$2 per doz.; Universal Washer Cutter, \$8 per doz.; Novelty Pen Puller, 40c. per doz.

Discounts 20% from above list. Send your orders through any responsible U. S. export  
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articles constantly appearing. Goods shipped to all parts of the world.

BEWARE OF IMITATIONS  
NONE GENUINE WITHOUT  
MY PORTRAIT AND SIGNATURE

Trade Mark.

**TRILBY LEATHER POLISH**

W. H. Goodrich

MADE BY  
**TRILBY MFG. CO.**

CAMPELLO, MASS. U.S.A.  
Prepared Expressly  
for  
RUSSIA CALF,  
RUSSET and SEAL,  
KID, GOAT  
AND ALL  
Fine Brown Dry Leathers.  
Price, 25 Cents.  
For Ladies and Children  
especially.

## W. H. GOODRICH'S 20<sup>th</sup> CENTURY SHOE POLISHES

AND IS WATERPROOF.  
TRADEMARK.

### TRILBY RUSSET—

prepared expressly for Russia Calf, Goat, Kid  
Seal, Harnesses, Leather Hand Bags, Cases and All  
Fine Dry Brown Leathers.

### TRILBY BLACK—

prepared expressly for Patent Leather, Enamel,  
Kangaroo, Dongola, Kid, Goat, Seal, Box Calf, Har-  
nesses, Leather Hand Bags, Cases and All Fine Dry  
Black Leathers.

Used exclusively by the manufacturers of fine  
shoes, and recommended by them to their cus-  
tomers as the **BEST POLISH** on the market, and  
the **ONLY** leather preservative.

Endorsed by the Leading Leather Houses.

### A COMBINATION OF OILS.

No Glue, Acids, Shellac or Ammonia  
used in the manufacture of our goods.  
Will positively preserve your shoes.

20th Century Polish, with sponge attached to  
cork, put up in neatly decorated tin cans. A  
liquid dressing applied same as the "Celebrated  
Trilby Polish." Gives an elegant and even polish,  
and will last for a week after once applied.

STRICTLY WATERPROOF.

### Trilby Black Polish

for Box Calf without an equal

Originators of the Famous Ox Blood and Latest Tan  
tains, used to convert light colored shoes into the pop-  
ular shades of the day. Our Russet Polish is used in  
connection with these widely known stains as a finish.  
We do not guarantee satisfactory results unless used.  
This Russet Polish is very popular. Saves time. Cleaner  
to use. No paste required. Does away with combina-  
tion packages, as it cleans and polishes at the same time  
and is not injurious to leather.

QUALITY COUNTS. OUR GOODS HAVE MERIT.

## GOODRICH POLISH MFG. CO.

All mail sent to

CAMPELLO, MASS., U. S. A.

Boston Office, 287 Devonshire Street.

Chicago Branch, Distributing Point, 181 Franklin Street.

Orders filled through commission houses.

Correspondence solicited.

## MAST, FOOS & CO.

SPRINGFIELD, OHIO, U. S. A.

MANUFACTURERS OF

## IRON TURBINE WIND ENGINES.

### STRONG and DURABLE.

Has stood the test in every civilized  
country on the globe.

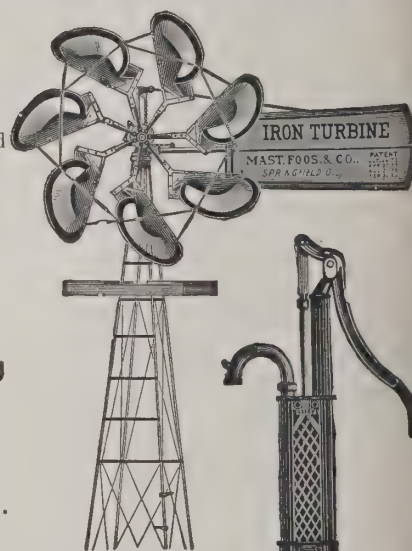
### RUNS IN A LIGHT WIND.

### BUCKEYE

## Senior Lawn Mower,

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10, 12, 14, 16 &amp; 18 inch Cut.

STRONG, DURABLE,  
LIGHTEST RUNNING.

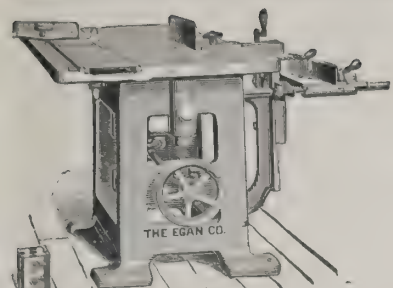
## Buckeye Force Pump.

Works easy and throws a constant  
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Pump in the World  
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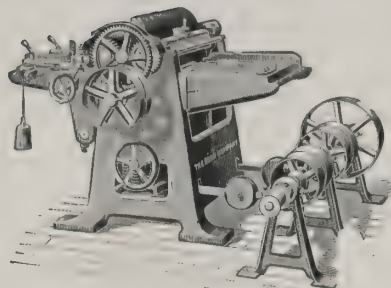
FAR SURPASSING  
ALL OTHER  
MACHINES MADE.

in use. Never freezes in winter. Send for Circulars and  
Prices giving Depth of Well.





Universal Rip and Cross-Cut Saw for Sawing, Planing, Jointing, Boring, Gaining, Tenoning, Panel Raising, etc.



No. 2 Planer and Matcher, Planes 24 in. wide, 6 inches thick. Matcher 12 in. wide.

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164 to 184 West Front St., CINCINNATI, Ohio, U. S. A.

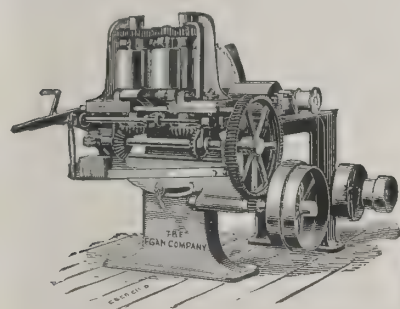
Mechanics and Engineers,

MANUFACTURERS OF

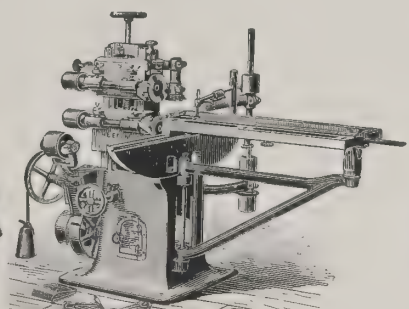
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Correspondence solicited.

Catalogue on application.

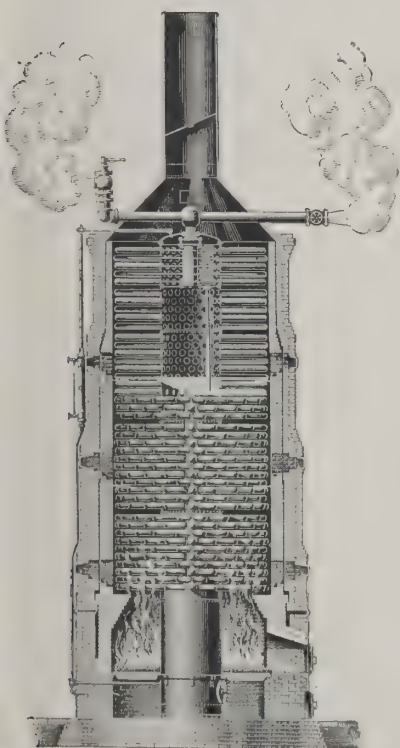


No. 1, 24-inch Circular Re Saw, Rolls to Bevel, Saw adjustable to and from Rolls.



No. 1 Cabinet Tenoner, without Copes  
No. 2 Sash Tenoner, with copes.

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**The Safest  
and Best  
IN THE WORLD.**

The Hazelton or Porcupine Boiler and The Stillman Bagasse Furnace have a record on Sugar Plantations, for efficiency, economy and durability, unequalled by any other combination.

After many years of active service in all the principal industries The Hazelton or Porcupine Boiler has proven itself superior to all others.

It will pay you well to fully investigate its merits before placing your order elsewhere.

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Established 1884. Sole Proprietors and Manufacturers, Incorporated 1888.

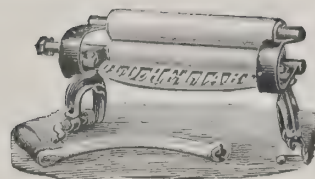
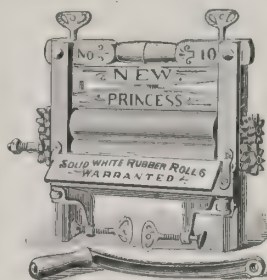
General Office: 76 EAST 13th STREET, NEW YORK, U. S. A.

Cable Address: "PAILA," New York.

Use "A.B.C. Code, 4th Edition."

NEW YORK, U.S.A. **O. B. STILLMAN, Agent,**  
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HAVANA, CUBA.  
Apartado 398,  
22 Mercaderes.

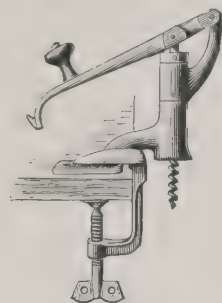


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Limited,

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Manufacturers of a Full Line  
of

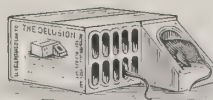


LIGHTNING  
CORK PULLER.

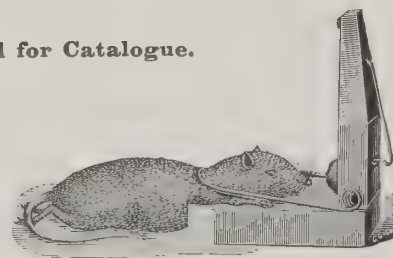
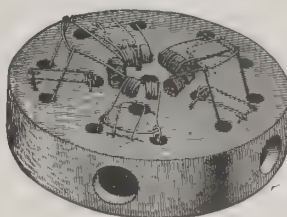
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Send for Catalogue.



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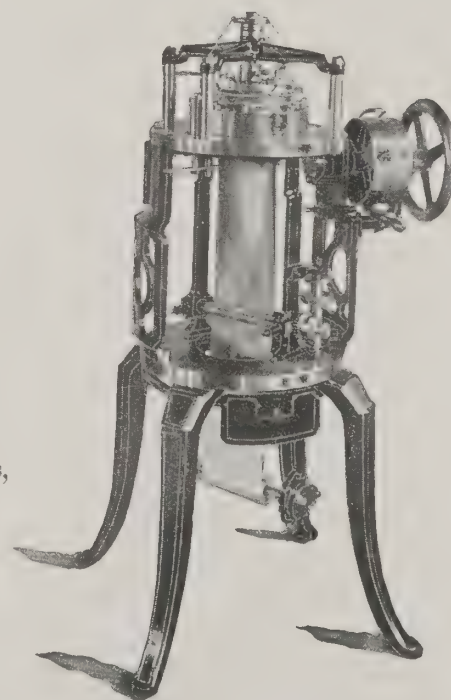
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HIGH SPEED,  
Plain and Automatic,  
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## Knitting Machinery,

FOR KNITTING

Ribbed Shirts, Tights, Skirts,  
Drawers, Jackets, Combina-  
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Athletic Suits, Hosiery,  
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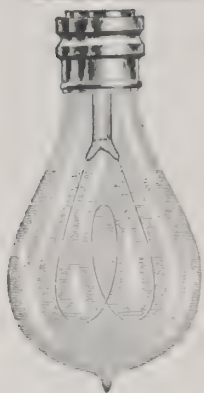
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ESTABLISHED REPUTATION FOR

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MAKERS OF

## Incandescent Lamps

From  $\frac{1}{2}$  to 300 c. p. of the highest grade only.

WE GUARANTEE THEM TO GIVE ENTIRE SATISFACTION.  
LAMPS IN ALL COLORS UP TO 32 C. P.

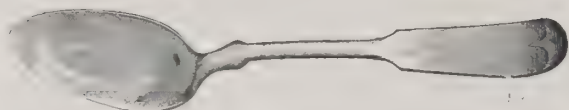
BEACON LAMP COMPANY, New Brunswick, N. J., U. S. A.

### PRICES, WEIGHTS, ETC.,

AS FOLLOWS:

C. P.	Price.	Price.	Barrel contains
8 to 24	16c.	18c.	300 Lamps.
25	20c.	22½c.	250 "
31	25c.	28c.	150 "
50	44c.	50c.	65 "
100	88c.	\$1.00	20 "
Weight per barrel, 75 lbs.			
Cubic feet per barrel, 8½.			

## HIGHEST GRADE OF SPOONS AND FORKS.



TIPPED TEA SPOON, HALF SIZE.



The above cut represent our  
INLAID SILVER BEFORE PLATING.



RIALTO TEA SPOON, HALF SIZE.

Send for Illustrated Catalogue and Price List. Made only by

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NEW YORK SALESROOM, - - 2 MAIDEN LANE.



## Johnston's Standard Kalsomine and Fresco Paints,

Ready for Use!

FOR WALLS AND CEILINGS.

Absolutely Reliable!

GOLD MEDAL, NEW ORLEANS, 1884-5.

EIGHT FIRST-CLASS AWARDS.

**Cheaper than Wall Paper or Oil Paint.**

Pure White and Beautiful Tints. Will not rub or scale from the wall. Invaluable in cleansing and disinfecting walls impregnated with germs of disease. Mixed in five minutes ready for the brush, by the addition of water only. Five pounds will cover with a good body 500 square feet on hard-finished walls. Send for sample card and prices to

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Orders filled through commission houses. Correspondence solicited. Catalogue "J" on application.

$\frac{3}{4}$  of Full  
Size, Open.



**BLAIR'S SECURITY FOUNTAIN PENS.**

THE VERY BEST. Non-Leakable. Regular Shape Gold Pen. Moderate Prices. A Guarantee for 1 Year.



**BLAIR'S POPULAR STYLOGRAPHIC PEN, with Silver Spring Needle.**

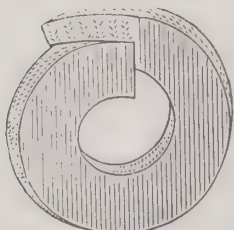
**THE JOHN BLAIR  
GOLD PENS.**

WARRANTED 14 K.

Leather Safety Pen and Pencil Pockets, Blair's Fountain Ruling Pens, Force-Feed Mucilage Tubes, Recherche Inks, Pearl, Ebony and Silver Holders. Gold and Silver Pencils, Etc. Send for prices.

**BLAIR'S FOUNTAIN PEN CO.,**

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TRADEMARK.

## GOULD'S STEAM AND WATER PACKING.

Patented June 1, 1890.—The Original Ring Packing.

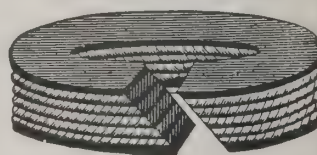
IN ORDERING, GIVE EXACT DIAMETER OF STUFFING BOX AND PISTON ROD OR VALVE STEM.  
**SELF-LUBRICATING, STEAM AND WATER TIGHT.**

Less friction than any other known Packing. Never grows hard if directions are followed. Does not corrode the rod. EVERY PACKING FULLY WARRANTED.

N. B.—This packing will be sent to any address, and if not satisfactory after a trial of 30 days, can be returned at our expense. None genuine without this trademark and date of patent stamped on wrapper. All similar packings are imitations and calculated to deceive.

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ORIGINAL RING PACKING

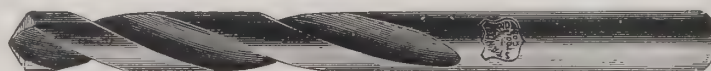


ALBION CHIPMAN, Treas.

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MANUFACTURERS OF

**Increase Twist Drills.**



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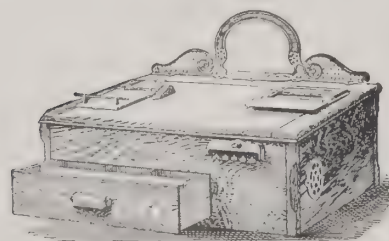
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## BUSINESS IS DULL!

But that is no reason for not watching every dollar that is taken in and paid out by you and your clerks. Indeed, these are times when you can least afford not to have a cash system for keeping track of the business you are doing. Our Recorder will do the work of a cashier whose salary for six weeks will pay the entire cost of the machine, freight included. Absolute protection against FORGETFULNESS.

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**HOUGH CASH RECORDER CO., Indian Orchard, Mass., U. S. A.**



Twist Drills made by this Company are HOT FORGED by an Entirely New Process.



They are TOUGHER and STRONGER than the OLD STYLE Milled Drills.

Bit Stock Drills,  
Taper Shank Drills,  
 $\frac{1}{4}$  inch " "  
 $\frac{1}{2}$  inch " "  
Drills, fitting ratchets  
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# GERNERT BROS. LUMBER CO., Inc.

Sole Manufacturers of the  
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## PRESSED WOOD ORNAMENTS.

250 Various Designs and Sizes. 10 kinds of Wood. From  $\frac{3}{4}$  in. to  $4\frac{3}{4}$  in., round and square, and from  $2\frac{3}{4} \times 3\frac{3}{4}$  in. to  $3\frac{3}{4} \times 15\frac{3}{4}$  in. oblong.

HARDWOOD FINISH AND VENEERED OAK  
DOORS A SPECIALTY.

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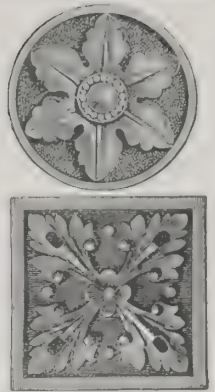
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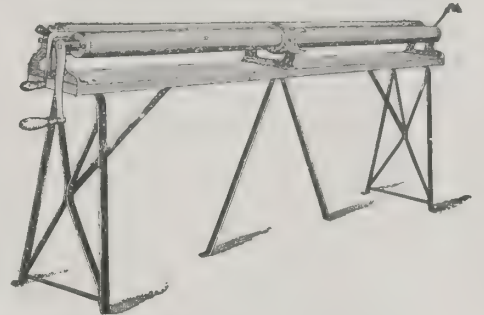
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We desire to call your attention to our system of slitting Sheet Metal and forming the same into EAVES TROUGH, which is so largely used throughout the United States.

The **CAPITAL ROTARY SLITTING SHEARS** are designed to cut sheet metal into strips for forming into Eaves Trough or any other purpose where long lengths are required. The machine is furnished with two or more sets of cutting disks, which are adjustable to any width desired, and will cut a whole sheet of metal, 30 inches wide, into strips of any desired width. The **CAPITAL GUTTER FORMER** is adapted to form Eaves Trough from 3 to 8 inches wide from sheet metal strips 8 and 10 feet lengths, and has a capacity of 800 feet per hour, with two ordinary men or boys.



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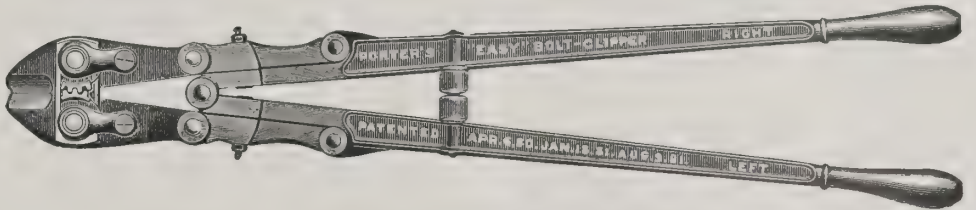
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THE

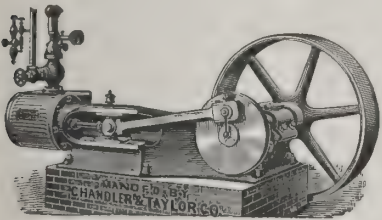
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IS THE BEST.

MANUFACTURED BY



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WELL BUILT.

SERVICEABLE.

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12 to 100 Horse Power. Suitable for Heavy Continuous Work. Every Engine TESTED under full load.

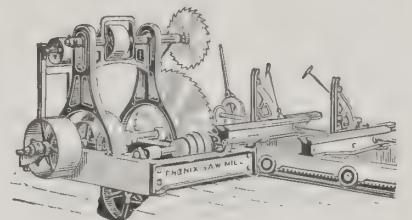
**Suitable Portable and Stationary BOILERS**

On hand for immediate delivery.

CIRCULAR SAW MILLS for all classes of work and MULAY MILLS for Light Power.

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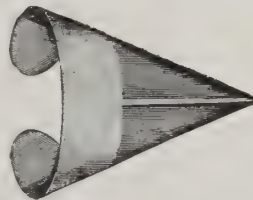


ESTABLISHED 1872.

## BAXENDALE & CO.

FACTORY AND OFFICE:

93 Centre Street, BROCKTON, Mass., U. S. A.



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Toes of Boots and Shoes.

OF ALL STYLES IN LEATHER AND LEATHER BOARD,  
AND COMBINATION LEATHER.

Flexible Leather Boxes a Specialty. A Perfect Fit Guaranteed. Send a Last for Sample Lot, or Wooden Model showing Toe of Last.

GUARANTEED TO CURE DIPHTHERIA:

## THOMPSON'S DIPHTHERIA CURE.

Not only prevents and cures Diphtheria, but is an infallible remedy for all affections of the throat.

It is a family friend that households should never be without.

If administered according to directions it never fails to cure. Harmless if taken internally.

THIS REMEDY IS PREVENTIVE AS WELL AS CURATIVE,

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Call at your dealer's or enclose stamp for full particulars to the manufacturers,

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The Only Remedy That  
Positively Cures Diphtheria.

**THOMPSON'S  
DIPHTHERIA  
CURE.**

Guaranteed to Cure.  
Unfailing Certainty.

50c AND \$1.00 PER BOTTLE

Manufactured by

**THOMPSON DIPHTHERIA CURE CO.**

WILLIAMSPORT, PA., U. S. A.

## CROSBY STEAM GAGE AND VALVE COMPANY,

MANUFACTURERS OF

## Standard Steam Appliances.

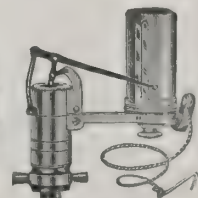
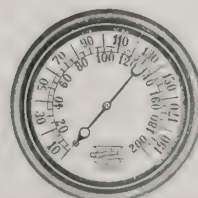
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Crosby Pop Safety Valves and Water Relief Valves,

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Catalogue No. 7 sent on application. Crosby Steam Engine Indicators, and many other specialties.

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Safety Valve.

Water Relief Valve.

Steam Gage.

Indicator.

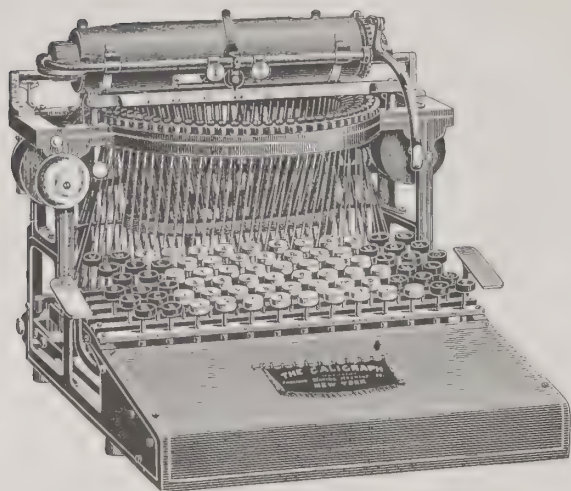
Chime Whistle.



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SUMS UP THE GOOD POINTS OF THE

## No. 4 CALIGRAPH Typewriter.



"IT  
OUTLASTS  
THEM  
ALL."

PRICES: { No. 2 CALIGRAPH (72 Characters) WITH OFFICE CASE, - \$85.00  
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237 Broadway, New York, U. S. A.

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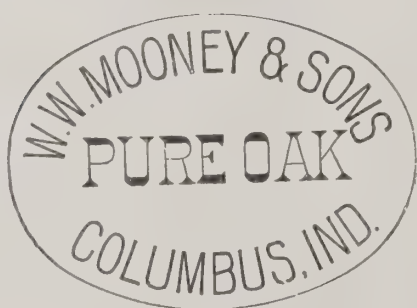
## W. W. MOONEY & SONS,

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TRADEMARK.

Tanners  
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Curriers.

Pure  
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Harness  
Leather.



This means  
THE BEST.

THE BEST  
always means  
THE  
CHEAPEST.

SEND FOR PRICE LISTS.

**The MOONEY Leather** has no superior in the markets of the world. A proof of its superiority is the preference obtained for it in England and in the colonies. Why is this so?

MOONEY Leather has great tensile strength.

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NO WHEEL-STUFFING PROCESS TO ADD EXTRA WEIGHT!

### THE MOONEY LEATHER

IS GUARANTEED

PURE OAK-TANNED,

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No. 1 TANNAGE AND FINISH.

**HARNESS**

**LEATHER.**

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MANUFACTURE THE

## Tremain Steam Ore Stamp,

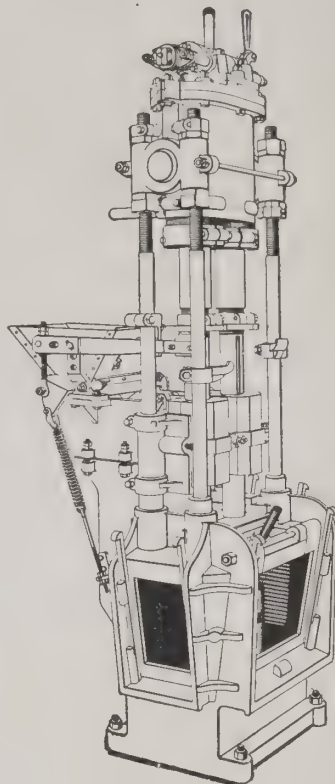
The latest and best method  
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Capacity equal to a five-stamp gravity mill  
and costs about one-half to install.

Made SECTIONAL for mule-back trans-  
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All complete with automatic feeder.

It only weighs 3,300 pounds.



## Gates Rock and Ore Breaker.

OVER 3,000 NOW IN USE.

**Every Kind of Mining  
Machinery.**

WE HAVE THE MOST COMPLETE AND MODERN WORKS.

Correspondence in all languages.

Please mark your letters "Dept. AA."

Address for full information,

## GATES IRON WORKS,

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# WHITTEMORE BROS. & CO.

The Oldest and Largest Manufacturers of Boot Polishes in the World,

237-243 Albany St., BOSTON, Mass., U. S. A.

Wholesale Manufacturers and Exporters of the following STANDARD  
BRANDS for BOOTS, SHOES and HARNESS:



## "GILT EDGE" OIL POLISH,

for ladies' and misses' shoes, is far superior to all others, as it  
blacks, polishes, softens and preserves the leather. Bottles  
hold about double the usual quantity. Price per gross, \$16.00;  
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for illustrated price list.





# THE AMERICAN EXPORTER.

ALLEN RIPLEY FOOTE, EDITOR.

THE JOHN C. COCHRAN COMPANY, Publishers

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## TO AMERICAN MANUFACTURERS.

THE AMERICAN EXPORTER was established in 1877 for the express purpose of developing a foreign demand for American manufactures, by calling the attention of the leading foreign importers and consumers to the unrivaled facilities in this country for supplying their wants.

It is published monthly, in separate English and Spanish editions, for dispatch direct by mail to the leading importers in every country outside of the United States.

It is absolutely free and independent of any and all other existing export agencies. Its mission is to originate trade, and not to execute orders, which is properly the function of the commission merchant.

It affords equal facilities for, and does equal justice to, all its advertisers.

It does not take goods in exchange for advertising space.

It does not employ the purchasing power of commission merchants and shippers to influence patronage.

## TO ADVERTISERS.

THE AMERICAN EXPORTER is the only independent and impartial export paper published. It is independent because its publishers are not engaged in any other branch of the export business. They are neither export commission merchants nor manufacturers selling agents, and hence they are under no more obligations to one advertiser than to another.

It is impartial because it treats all its patrons alike. It cannot, for this reason, and it does not, publish write-ups or puffs of any specific make of goods, no matter whether advertised in it or not. It charges the same price for the same services to all alike.

We desire it distinctly understood by those who contemplate advertising in THE AMERICAN EXPORTER that space for advertising purposes is sold only upon the merits of the publication for that purpose. For this reason no advertising solicitor or agency has any right or authority to agree to give reading notices or to perform any special service whatever to obtain orders for advertising.

We make it a practice not to discuss the merits or demerits of other export trade papers. Comments on their value may be made with more propriety by those advertisers who have had experience in the use of such publications.

THE JOHN C. COCHRAN CO.



## NATIONAL ASSOCIATION OF MANUFACTURERS OF THE UNITED STATES.

THE second annual convention was held January 26th, 27th and 28th, 1897, in the city of Philadelphia, Pa. The verdict of every member in attendance was one of complete satisfaction with the work accomplished and proposed. Every one realized the far-reaching benefits the association is destined to confer upon its members and were generous in their acknowledgments of the masterful service rendered by Mr. Theodore C. Search, of Philadelphia, the president of the association, in bringing in one year, out of a chaos of unaffiliated manufacturers, an association that he could address as representing "in capital invested, in value of products and in number of hands employed a larger aggregate than any other business organization in the world."

This rapid growth is based upon a broad foundation that gives promise of greater future development. The association is thoroughly national and representative of the manufacturing interests of the United States in every respect. Every section of the country and nearly every industry of importance is represented in its membership. Its acts or utterances may fairly be accepted as indicating broadly the sentiment of the manufacturers of the United States. The direct earnestness with which the work of the association has been outlined and taken up is well indicated by the topics discussed in the president's annual address. They are: South American Commission; Sample Warehouses in Foreign Countries; Trade Relations with Mexico; Japan as a Competitor and a Customer; Trade Opportunities in China; Nicaragua Canal; Restoration of American Merchant Marine; the Tariff; Reciprocity in International Trade; Reform of the American Consular Service; the Creation of a National Department of Commerce and Manufactures; Protection of American Patents and Trademarks in Foreign Countries; Uniform Freight Classification; National Bankrupt Law; Paris Exposition of 1900; Tennessee Centennial Exposition at Nashville and the Incorporation of the Association by National Charter. These topics were all discussed with earnest intelligence, but those relating to intercourse and trade with foreign countries commanded by far the most absorbing interest.

Many foreigners are under the impression that the United States is essentially an agricultural country and that its manufacturing interests are only of secondary importance. This impression will be removed by the statement in the report of the Committee on the Creation of a National Department of Commerce and Manufactures, showing that the manufactured products of the United States exceed the agricultural products in the ratio of three to one, and that the total agricultural output in the United States for the census year of 1890 was only a little over three billions of dollars, while the manufactured products for the same period amounted to between ten and eleven billions of dollars.

### THE TARIFF AND RECIPROCITY.

The discussion of the tariff was most spirited and was followed with intense interest. Every one realized that this, of all subjects, was the rock on which the association might split. Included in the membership are persons holding all shades of opinion on the broad questions of free trade and protection. After a perfectly free exchange of views the association happily agreed, without a dissenting voice, to the adoption of the following:

"*Resolved*, That it is the sense of the National Association of Manufacturers that the tariff law should be revised at the earliest possible moment, in order that uncertainty may be removed, confidence restored and business permitted to revive.

"*Resolved*, That the duties should be such as will be consistent with adequate protection of our manufacturing and agricultural industries and the labor they employ. The tariff should contain only specific duties or mixed ad valorem and specific duties.

"*Resolved*, That Congress be invited to re-establish and extend the system of reciprocity, which may be employed to secure for us tariff favors in Latin-American and other markets in which we are the largest buyers, while Europe is the preferred seller solely

because of the lower wage rates and lower general cost of production in European factories."

Reciprocity in international trade was a favorite subject with many members. It is not their intention to limit the revival of this national policy to the nations of the Western Hemisphere, but to make it all-inclusive and thus extend the hand of good fellowship to every nation on the globe. Much enthusiasm was manifested when it was announced that these resolutions pertaining to the tariff and reciprocity would go out to the world as the unanimous expression of delegated representatives of more than 900 of the leading manufacturers of the United States, speaking as one man.

### RESTORATION OF AMERICAN SHIPPING.

There was an uncomfortable sense of humiliation when the condition of the American merchant marine was under consideration. The only plausible excuse for the neglect of this industry was given in the statement that the attention of the people had been absorbed with the construction of facilities for the development of domestic trade. Having covered that field, attention will now be given to the development of American transportation lines on the oceans. In furtherance of this view of the subject the following was adopted:

"*Resolved*, That this association views with the greatest pleasure and satisfaction that the need of protecting American ships in the foreign trade has recently received extended attention and approval by the American people and by President-elect McKinley, under whose forthcoming administration it is our earnest hope and expectation that this long-deferred revival of the American merchant marine will be patriotically, zealously and immediately undertaken, so that American foreign commerce may hereafter and evermore employ ships built, owned and manned by Americans."

### IMPROVING THE CONSULAR SERVICE.

At the first convention of the association a thorough inspection of the Consular service was urged with much emphasis. As a result, at its last session Congress authorized and provided for a thorough and impartial inspection of all Consular offices, for the purpose of ascertaining the changes in personnel and organization calculated to promote the efficiency of the service. Three attaches of the State Department are now in the field conducting this investigation, which already has embraced Mexico, Canada, Great Britain and Europe, the West Indies and portions of South America. President Search states that reforms of material value have resulted from this inspection, and with this important work completed and the Department of State fully advised of the condition of the Consular offices, there will be opportunity to reform the service in a marked degree. To secure the best men and the highest degree of efficiency in the service he recommends as absolutely essential:

1. A system of appointment and promotions based solely upon merit.
2. Tenure of office during good conduct and competency.
3. Compensation sufficient to induce competent men to enter and remain in the service.

After a full discussion the following was adopted:

"*Resolved*, That it is the sense of this association that the entire Consular service should be placed under the Civil Service rules, for the purpose of creating a corps of trained Consuls and Consular officers and clerks.

"*Resolved*, That Consular officers and clerks should be American citizens, receiving reasonable salaries and not fees.

"*Resolved*, At the most important trade centres we recommend that our Government should own Consular buildings of sufficient size and character to make proper and dignified headquarters for the commercial representatives of this country."

The American Consular service, as it is, has received much praise from foreigners when contrasting the work shown in its reports with their own. When these proposed reforms are fully made and the good results expected are fully developed the Consular service of the United States will be by far the most efficient service of its kind in the world.



## HOW AMERICAN MANUFACTURERS CAN SECURE FOREIGN TRADE.

NO topic was discussed with keener practical interest by the members of the National Association of Manufacturers while attending their second annual convention than that of ways and means for extending their foreign trade. This topic was not only a subject of public discussion, it was the theme of many animated private conversations. Some there were who had established business relations in all the world's markets, others were feeling their way to foreign markets and had filled orders here and there, and still others were conscious that they had never been heard of throughout the great domain of commerce lying beyond the comparatively small territory of the United States. They had thought a market to supply 70,000,000 of people immense, but as they heard others talk, who had accustomed themselves to consider the world in mapping out a business programme, and realized that the market outside the United States called for supplies for 1,370,000,000 consumers, they looked upon those who had successfully entered the greater market with unconcealed admiration and congratulation. While there were measures of purely domestic interest considered, the whole trend and force of the convention was to stimulate a desire on the part of every one to extend or begin a foreign trade, and to provide ways and means for doing so. The effect of this convention will be to give an impetus to efforts to secure foreign orders such as American export trade has never before received from such a cause.

In discussing ways and means for creating a demand in foreign markets no advice is so effectual as that given by those who have made the attempt successfully. All that was said on this topic by such men was to the point and carried conviction with it. The most enjoyable and, in the opinion of many delegates, the most instructive session of the convention was the evening devoted to a symposium on foreign markets. What was said was a revelation to many of the manufacturers present, and when, at the close of the meeting, President Search said, "I feel gratified at the results of this symposium, and I am sure that all who are present must feel encouraged from what they have heard," there was a hearty response in applause from the members.

Ex-Mayor Charles A. Schieren of Brooklyn read the opening paper on the wonderful development of German industry and commerce. He held up the German methods for securing foreign trade as worthy of close study and adaptation by American manufacturers. In the course of his remarks he said:

"Not only the government, but the people do everything to extend foreign trade. They train young men for the foreign field, compel them to master the language of the country and study whatever peculiar customs or manners the people may have where they wish to trade."

This but illustrates close attention to every detail. Germans do not take so much pride in their language that they send literature in German to those who cannot read it, or agents to speak German to those who cannot understand them. German circulars, advertisements and agents all appeal to the people from whom they solicit orders in their native tongue. They make themselves acquainted with what the people can be induced to use, and show their samples where they try to make sales. This is what every American manufacturer does in obtaining domestic trade; this is what he will have to do to secure a large foreign trade.

Mr. J. P. Wood, of Philadelphia, spoke informally on the foreign field for textile goods. He said:

"The American manufacturer must give up the idea of regarding foreign markets as a dumping place for goods that will not sell at home, and he must be careful to send only such articles as have been found to be acceptable in the countries where they are sent. Salesmen in foreign markets must be men of ability and tact; they must carry more lines of goods than they would at home; but they must not carry too many, or they will be unable to be well informed in regard to all. Good American-made goods find a ready market abroad. In order to reap the advantages of foreign trade, how-

ever, consistent and persistent activity is necessary. The present high standard of quality of American goods must be preserved; in cheap goods we have no chance in foreign competition."

Mr. William Harper, representing the Commercial Museum of Philadelphia, described the trade of Argentine and Brazil. He said:

"Argentine is totally different from all other Spanish-American countries. Its business is transacted more like that of London and Paris. In a few years it will be one of the most important export markets for the United States.

"In Brazil there are great opportunities for American goods, where they are now much in use. The great necessity for securing this trade is competent American salesmen and foreign warehouses as places of exhibit and points of distribution."

Frederick F. Smith, of New Jersey, pointed out the immense field for American machinery abroad. He said:

"Within three months, without much special effort, I have secured orders to a considerable amount. Manufacturers abroad buy readily when they see what wonderfully light machines are made in the United States."

Such was the trend of all addresses and conversation regarding foreign trade and how to get it. The whole is a magnificent confirmation of the work done by THE AMERICAN EXPORTER during its nineteen years of service. Its advice to American manufacturers has always been—to secure foreign trade use the same methods and instrumentalities that have been successful in securing American trade but adapt them to the language, customs and tastes of the people from whom you seek orders. Never forget that the farther an article is sent the greater is the necessity for having it good. An article that gives satisfaction is the best representative an American manufacturer can have in a foreign country.

## OF INTEREST TO AMERICAN MANUFACTURERS ONLY.

WHEN discussing ways and means for securing foreign trade manufacturers are aware that judicious advertising is an instrumentality of more than secondary importance. They are also aware that their liability to make mistakes in using this means is greater than in the use of any other agency at their command. This remark is particularly applicable to advertising in trade journals. The reason for this is plain. When a manufacturer spends his money for printing and distributing his own literature, circulars, catalogues, etc., the effort made and its results are wholly under his personal control and direction. If the returns do not compensate him for his outlay he gets his experience, and is satisfied that his plans were faithfully carried out, and can attribute the failure to numerous causes other than his own lack of judgment. The comfort derived from this source enables him to contemplate the unsatisfactory effort with equanimity. On the other hand, if satisfactory returns are secured he gains the added satisfaction of having his judgment confirmed. This gives him confidence and augments the attraction of this method of advertising, and largely accounts for the great sums annually spent in that direction.

When a manufacturer employs salesmen, recognized universally as being the most effective means of advertising, he has them under his personal direction, and can measure with a fair degree of accuracy the value to him of each, because he can trace the results of his work. While this is true, no manufacturer has escaped making mistakes in the selection and management of his agents. His judgment is often at fault, and is invariably dependent upon experience to guide him in encouraging the successful and eliminating unsuccessful men. In the use of these two instrumentalities for securing trade, his own literature and his salesmen, the manufacturer keeps in touch with every movement, can feel the direct result of every effort, and guide his course by his experience from year to year. With these advantages in forming judgment, every manufacturer makes mistakes, but no one permits these mistakes to cause him to discontinue his efforts. If one circular fails, sent out in a certain way at a certain time, a manu-



facturer will try another, send it out in a different way at a different time, and he will keep trying until the average result is success. If some salesmen do not secure a sufficient volume of trade to justify their expense he does not discontinue employing agents, but tries first one and then another, until he succeeds in securing a corps of salesmen whose orders will keep his factory fully employed.

In using the other of the three means for securing trade at his command, advertising in trade journals, his liability to make mistakes include the normal conditions pertaining to the other two departments of effort, augmented by the facts that the work done is not carried out under his personal observation, nor do the results come to him in a direct or tangible form. The greatest disability a trade journal labors under in building up its clientele is its inability to give tangible evidence of the full value of its work. These facts tend to make the manufacturer the victim of many specious schemes, and the losses thus inflicted upon him cause him to become suspicious of all advertising mediums and underrate the benefits he may receive by cordially supporting those that seek to render intelligent and honest service. Suggestions to assist manufacturers in avoiding mistakes in selecting advertising mediums are considered particularly applicable at this time:

1. He should recognize the broad difference between a legitimate trade journal and a house organ. A legitimate trade journal has nothing for sale except its advertising space. Its prosperity depends upon making that space as valuable as possible to every advertiser. Its best means of doing this is to make its reading matter valuable to buyers. Foreign buyers are in *foreign* countries, therefore an export trade journal must circulate in foreign countries, not at home, and its reading pages must be designed to favorably impress foreigners with the advantages derivable from using American products. It must do this on general principles, and not belittle its influence by descending to fulsome puffery of any special article. Its only interest is to promote trade that will be satisfactory to manufacturer and buyer. The interests of the manufacturer, the foreign buyer and the export trade journal publisher are identical. This is not true of the house organ. The publisher of a house organ is in business as a buyer and seller of goods. The promotion of the sale of his own goods is his direct interest. The object in admitting outside advertisements is to get others to pay the expense of publishing and circulating his own catalogue or circular. This is gain in which neither the advertiser nor the foreign buyer has any interest. Good judgment in avoiding illegitimate and specious advertising schemes is undoubtedly the foundation of success in general advertising.

2. Advertising to secure foreign trade cannot be successful if done spasmodically or for a limited time. The broader the field the more time is there required to effect results. In our great cities merchants can advertise their bargains in a Sunday paper and expect a rush on Monday, but an advertisement published in a journal circulating in all the world's markets, outside the United States, does not reach all of its readers within the month of publication, and the return effect of the issue requires a much longer time. The value of persistently keeping the merits of an article, and the name of its manufacturer, before the people, so often illustrated in advertising for domestic trade, acquires added force when applied to advertising for foreign trade.

3. One other observation may be permitted. The chief value of an advertisement in an export trade journal is in its ability to increase the productiveness of the other means used to secure foreign trade—circulars and salesmen. A manufacturer who uses all three instrumentalities, in estimating their value will credit a portion of the apparent direct results from his circulars and his salesmen to the influence of his trade journal advertising in making his goods and himself generally known. Any salesman will testify to the difference in conditions he encounters when representing goods that have been liberally advertised and those that have not. A legitimate export trade journal is satisfied to be appreciated at its true worth, and counts itself fortunate if it secures for its support a reasonable consideration in return for the money it assists its advertisers to make.

## A WORD TO FOREIGN SALESMEN.

THE success of many American manufacturers in creating a demand for their products in foreign countries is stimulating a general desire in this country for foreign trade relations. The recent National Convention of Manufacturers has added increased momentum to the movement for securing foreign trade, the energy of which will not soon be expended. These conditions will create many opportunities of high value for buyers in foreign countries to establish trade relations with American manufacturers that will be enduring and mutually profitable.

The problem—How can American manufacturers create a demand for their products in foreign countries?—is now being discussed by the owners of 10,000 manufacturing plants who desire to operate them to their full capacity and to enlarge them. The business of manufacturing is but half the work of production, and it is the easiest half. Could goods be sold as easily as they can be made, could a permanent demand be increased as easily as a manufacturing plant can be enlarged, trade the world over would be increased by multiples instead of percentages. The problem of securing trade in foreign countries has not been considered, up to this time, by a majority of American manufacturers, but the successes some have made have awakened the ambition of many more. The day is not far distant when none of the world's markets will be neglected by American producers.

Manifestly, to create a demand for a product in any market, it must be favorably represented to prospective buyers. The representation must be made in their language, whether by circular, advertisement or personal solicitation. The article itself must give satisfaction and be adapted to the tastes, habits, customs or industrial uses of the people. The person who exhibits it must understand it so he can intelligently instruct prospective buyers fully regarding all its merits and uses. If it is a machine or tool he must be able to instruct buyers how to use it to its fullest capacity or advantage. Success in securing trade depends fully as much in proper representation as in making a useful article to be sold. All things cannot be advertised and handled successfully in the same way, but all things must be made known to a consumer in a way to secure his favor in order that they may be sold. The fundamental requisites are good descriptive circulars, advertising, and salesmen addressing buyers in their native language, and an exhibit of the goods where orders are expected. The place to exhibit goods is where they are to be sold, is a trade axiom good in every market.

Native salesmen in foreign countries, those who import articles to supply the wants of their markets, have many advantages over foreigners who come to their place to seek customers. The language, tastes and customs of the people are their own; what the people need, what will be a gain for them to use, how to best convince them of the advantages of the new over the old, is natural knowledge for the native salesman. Against this great advantage is the disadvantage of not knowing as much about the article to be sold as a man direct from the factory may. One of two things must be done—the manufacturer must either train salesmen to use the language, and understand the tastes, customs and business methods of the people to whom they are to be sent, or he must take native salesmen, who know these things naturally, and educate them to a proper knowledge of the thing to be sold. Which will be the most successful course depends entirely upon the ability and energy of the agents selected. Native importers, merchants and salesmen in all foreign markets should lose no time in qualifying themselves to occupy their own field, and thus hold for their own benefit the business that foreign salesmen will be sure to secure if sent among them. The time is ripe for foreign salesmen to effect valuable trade alliances with American manufacturers and to qualify themselves to properly handle American-made goods. The wisdom of doing this has been demonstrated in many cases. Such examples will be found in increasing numbers as the years pass. Sagacious and enterprising foreign salesmen will be quick to improve the opportunities now offering through the disposition of American manufacturers to seek foreign markets.



## AN INTERESTING CONCESSION.

MESSRS. CHARLTON AND FARRER, members of the Canadian Parliament, are now in Washington inquiring into the feasibility of negotiating freer trade relations between the United States and Canada. While Canada cannot give the United States a lower rate of duty than is given to the British manufacturer, it so happens, Mr. Farrer says, that a large number of commodities can be selected which can be put on the freelist, and which Canadians will purchase largely from American manufacturers because Great Britain cannot compete with the United States in producing them. He includes in this list sewing machines, firearms, pig and bar iron, axles and springs, locomotives and stationary engines, paper, printing machines and presses, gray cotton and cotton jeans, clocks and watches, brass goods, carriages and sleighs, drugs and chemicals, glass, boots and shoes, harness and saddlery, refined petroleum, paints, oils, rubber goods, furniture, electrical apparatus, etc.

When a Canadian member of Parliament acknowledges that English cannot compete with American manufacturers in the production of these articles he shows a much better understanding of industrial conditions than did Li Hung Chang when he reported American ships would cost more than European ships. The Canadian understands the effect of labor-performing machinery in reducing labor cost. The Chinaman did not.

## THE NATIONAL BOARD OF TRADE OF THE UNITED STATES.

THE National Board of Trade of the United States is a voluntary organization, composed of delegates representing local boards of trade. It has no official or governmental connection, nor does it perform any government function. It has no political party affiliation, nor is it identified with any industrial or commercial enterprise. Its sole object and function is to bring together representative business men from all sections of the country to discuss and recommend action by the proper authorities, on all questions pertaining to the domestic and foreign, industrial and commercial well-being of the people of the United States. Its judgments, being impartial and non-partisan, are entitled to great weight. They exert an important influence because it is known that they voice correctly the business views and common sense of the American people.

At its twenty-seventh annual convention, January, 1897, the National Board of Trade, by formal resolution, favored "a bill to provide for the reorganization of the consular and diplomatic service"; measures for reforming the national coinage, currency and banking system; an international monetary conference; reciprocal commercial relations between the United States and foreign countries; the expansion of American export trade; a complete revision of inter-State commerce laws; the pooling of freight earnings, with the view of securing equitable and stable charges at all points; a national bankrupt law; the improvement of internal waterways; the connecting of the Mississippi and Ohio rivers with the Great Lakes, by the construction of deep water canals; the construction of the Nicaraguan Canal; the creation of a department of commerce, to be administered by a Cabinet officer, and the ratification of the treaty of arbitration between England and the United States. The action taken on these measures is evidence that American business men are keenly alive to the issues of the day and the progressive development of this country, and their amicable relations with the people of all other countries. In their councils the champions of war, of national aggrandizement by conquest, of commercial advantages gained by fraud have no voice. The spirit of the American people is well voiced in the following resolutions, which were unanimously adopted:

"Resolved, That the National Board of Trade calls attention, with pleasure, to the gratifying increase in our export trade during the past year (1896), especially in the manufactured products, which embody not only the use of American raw materials, but the employment of American labor. The quality and utility of American

products are recognized wherever they are known. The ingenuity of our inventors has produced thousands of articles of superior economy and convenience which, if intelligently presented to the 1,370,000,000 of consumers who exist outside of the United States, would find a market. That the same methods of publicity and personal representation pursued in the introduction of goods in this country will prove effective when applied abroad. That through associated effort much can be accomplished, and hence we commend all such efforts. That our Government should not only closely follow other countries in the policy of developing foreign markets, but whenever possible should take the lead in the commendable work."

"Resolved, That every consideration of the welfare of the United States as a nation, the healthful development of our material interests, and the highest prosperity and happiness of our people at home; the extension of our interests and cementing of amicable relations abroad, and the advancement of civilization, enlightened liberty and good will throughout the world require that the treaty of arbitration between the governments of Great Britain and the United States shall be approved."

Here are set forth substantial reasons why enterprising importers and merchants in all of the world's markets should seek commercial relations with American manufacturers. The statement is not overdrawn which says: American manufacturers produce thousands of articles of superior economy and convenience, which if intelligently presented to consumers outside the United States would find a market.

## ONE MILLION DOLLARS PER DAY NET GAIN.

THE sales of products during the year 1896 made by the United States to foreign countries exceeded its purchases of products from foreign countries by \$1,000,000 per day for the entire year. This is a good showing for the prosperity of the American Republic.

The annual average of exports and imports of agricultural products for five years, 1892 to 1896, inclusively, was:

Exports .....	\$874,512,164
Imports .....	772,093,529
Net gain.....	\$102,418,635

A trade balance in favor of the United States on agricultural products of over \$100,000,000 per year for five consecutive years gives a good indication of the difference in position with regard to food supply the United States occupies in comparison with European countries. Napoleon is credited with saying, "Armies move on their stomachs." So do industries and commerce.

## A LABOR-PERFORMING MACHINE.

ONE illustration may be given of the high efficiency of labor-performing machinery. The Arbuckles, in the coffee-roasting business, have a machine for putting up coffee or sugar in two-pound packages. The machine can pack 60,000 pounds in twenty-four hours, making 30,000 packages, nearly twenty-one packages for every minute. Two hundred persons, each making a package every three minutes for twelve hours, would be required to do this work. Add to this the advantages in handling on account of uniformity in shape and the saving in material used for each package, and it will be seen how much superior and less expensive machine labor is than manual labor. The high wages of the few persons required to attend the machine, added to the cost of operating it, make the labor cost per package less than that of the lowest-paid manual labor in any country.

THE National Board of Trade, U. S. A., held its twenty-seventh annual convention in Washington, D. C., commencing January 26, 1897. Forty-one organizations were represented. Its programme of subjects to be acted upon embraced sixty-nine resolutions and recommendations, all of national and some of international importance.



## 1897 WELL BEGUN.

WITH the close of 1896 came the negotiation of an arbitration treaty between England and the United States. The importance of this event is attested by the world-wide interest it has attracted. The value of such a treaty is illustrated as fully by the attitude of those who oppose it, or who seek to belittle it, as by the arguments of those who favor it. The particular wording or fate of this document is not its essential feature. The fact that will mark an epoch in international comity is contained in the idea, now forming into formal agreements, that the settlement of international differences is to be secured through the civilized processes of courts of justice, rather than by the barbarous processes of war. This is the new star of peace appearing in the heavens at the Christmastide of 1896, which has commanded the worship of the wise men of the world during the first month of 1897.

## ADMIRATION FOR AMERICAN CONSULATE SERVICE.

WHILE American business men are earnestly and wisely planning to effect great improvements in our consular service the efficient work done by American consulates is continuously calling forth much admiration from foreign observers. During the recent Presidential campaign the Department of State called on its consular agents to make a special report on money and prices in foreign countries. The information was collected, transmitted to Washington, compiled, printed and issued within three months' time. A French economic writer, Jules Lecesne, reviewing this publication of the Department of State, pays a high tribute to the American way of doing things and expresses the opinion that the French Government would have taken as many years to secure such results.

THE Philadelphia Commercial Museum has completed arrangements for an international conference of manufacturers and merchants in June, 1897. Representatives of boards of trade and chambers of commerce from all parts of the United States, will meet representatives from similar bodies from South American countries. The chambers of commerce in the following cities have already appointed their representatives: Panama, Colombia; Lima; Chili will send eight delegates; Buenos Ayres and Rosario, Argentina; Rio and St. Paulo, Brazil; also Bahia, Pernambuco and Para; Venezuela will send six delegates, Central America three and Mexico nine. This will make the most important gathering of South American business men ever convened outside their respective States. The greater portion of merchandise imported into South America, it is claimed, is handled by men who will be delegates to the conference.

WILLIAM McKINLEY, President-elect of the United States will take the oath and assume the responsibilities of office March 4, 1897. The constitutional term is four years. The President is eligible to one re-election. While the Constitution does not place a limit upon the number of terms a President may serve, custom, founded upon the example of the first President, George Washington, who declined a third term, ordains that no person shall serve more than two terms. Many questions of public policy world-wide in their influence will have to be dealt with by Mr. McKinley during his administration. Pre-eminent among these in its commercial importance will be the negotiation of a new treaty with the government of Nicaragua, which will provide for the construction of the Nicaragua Canal under the auspices and control of the United States.

THE National Association of Manufacturers, U. S. A., held its second annual convention in Philadelphia, Pa., commencing January 26, 1897. Nearly nine hundred manufacturing undertakings were represented in its membership. Its programme of subjects covered many topics pertaining to the development of American manufacturing industries, which necessarily took the course of discussing methods for the exploitation of domestic and foreign markets.

THE one hundredth anniversary of the admission of the State of Tennessee into the American Union is to be commemorated by an exposition of broad scope, which will be opened at Nashville, the State capital, May 1, 1897, and will remain open for six months. The buildings and grounds are now ready. The enterprise has been planned on a liberal scale. The buildings are large and architecturally attractive and the grounds are well adapted for the purpose. The exposition will be well supported by State and national governments and individual representatives of industry, commerce and art. Foreign countries and manufacturers will here find a good opportunity to make their products known to the American people.

## Exports of Manufactures.

ACCORDING to the official reports for the first eleven months of the calendar year 1896 it is altogether likely that the exports of manufactured goods from the United States to all countries for the full year will exceed in value the sum of \$250,000,000. The exports of manufactures for 1894 amounted to \$177,800,969 and for 1895 to \$201,152,771. The year past, it will be seen, shows a gain of about 25 per cent. over 1895 and 50 per cent. over 1894.

An examination of the list shows a decided increase in the exports of all articles of high degree of advancement and utility in the lines of machinery, means of transportation, textiles, electrical and scientific apparatus, hardware and tools.

The Bureau of Statistics has recently been making a separate classification of the exports of typewriters and bicycles. The item of cycles alone shows exports of \$3,408,612 for eleven months of 1896. The classification was not made until the Summer of 1895, so that the comparative figures cannot be given, but it is well known that the volume of exports has steadily increased. The total for the six closing months of 1895 was only \$243,721, or less than the average per month during 1896. Typewriting machines and parts were only classified from last July, but five months have already shown exports of \$538,860, which is said to be larger than in previous years.

The following table shows the increase of exports in the leading lines of goods for the month of November over those during the same month of the year 1895:

	Nov., 1895.	Nov., 1896.
Paintings and statuary.....	\$21,731	\$27,639
Books, maps and engravings.....	250,063	293,140
Brass, and manufactures of.....	57,631	75,978
Building and fire brick.....	12,217	22,053
Carriages and vehicles.....	120,213	139,199
Clocks, and parts of.....	71,381	87,317
Watches, and parts of.....	53,131	92,372
Copper, and manufactures of.....	939,703	2,790,077
Cycles, and parts of.....	44,418	328,458
Earthen, stone and china ware.....	9,414	11,507
Bags, cordage, twine, etc.....	127,715	180,739
Glass and glassware.....	85,782	105,978
Grease, grease scrap and soap stock.....	130,997	181,021
Gunpowder and cartridges.....	104,736	154,560
Scientific instruments and apparatus.....	159,940	256,413
Locks, hinges and other builders' hardware.....	233,962	352,881
Saws and tools.....	173,513	205,633
Printing presses, and parts of.....	35,032	134,689
Stationary engines.....	13,570	23,319
Boilers and parts of engines.....	48,344	55,931
Machinery, not including printing presses, sewing machines, boilers and steam engines.....	1,127,204	1,619,216
Scales and balances.....	23,087	38,009
Lamps, chandeliers, etc.....	53,278	75,832
Harness and saddles.....	15,730	24,272
Roofing slate.....	11,219	67,661
Organs.....	73,379	84,101
Paper, and manufactures of.....	209,146	237,461
Perfumery and cosmetics.....	26,684	34,267
Cheese.....	80,534	337,602
Seeds.....	137,155	980,294
Stationery, except of paper.....	72,848	84,579
Varnish.....	24,158	29,275
Doors, sashes and blinds.....	24,207	51,475
Household furniture.....	240,971	299,265

## To Make Diamonds.

THE announcement is made, apparently in all seriousness, by a newspaper published in Washington that Dr. B. H. Johnstone, a scientist of that city, intends to establish a diamond factory at Niagara Falls, where, by means of the great electrical power that will be available there, he will turn out gems to order of any desired size. That it is possible artificially to produce the crystallized carbon that is called diamond was proven some time ago, and has become generally known; but the artificial diamonds thus far produced are so very small that they are of no value as gems. Dr. Johnstone's idea is to use not the impure carbon, such as charcoal, which has been used heretofore by the scientists who have experimented with the manufacture of diamonds, but the pure carbon that is found in the mines. He will require at least 6,000 volts of electricity to effect the crystallization of such carbon, and as power of that extent is not easily obtained elsewhere, he will go to Niagara Falls to get it. He expects to be able to produce in a few days gems which through the natural process would require a million years to reach perfection. Anything desired in the shape of diamonds, from the ordinary solitaire to a gem like the kohinoor, will be turned out of Dr. Johnstone's factory—perhaps.—*Albany Express.*



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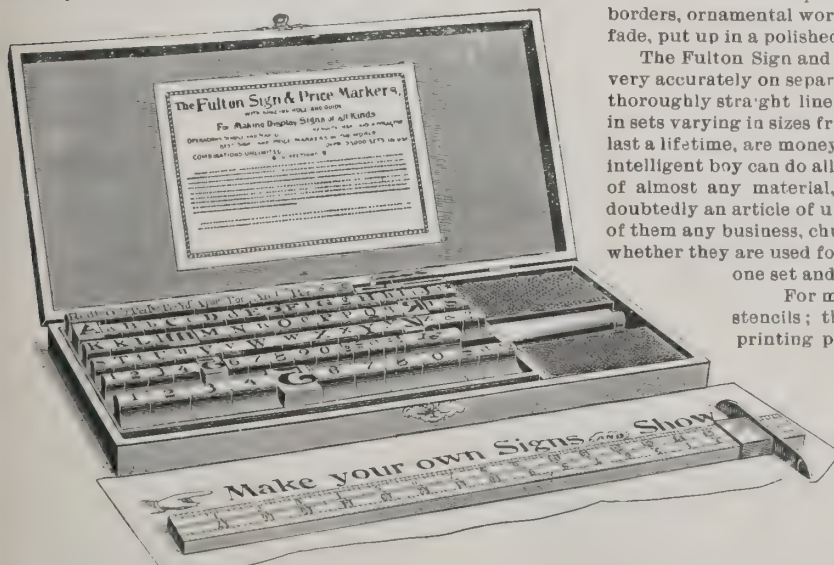
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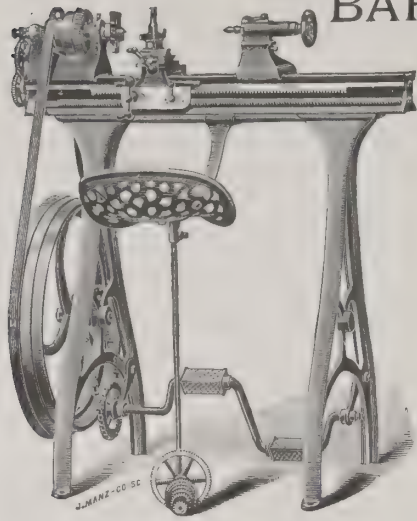
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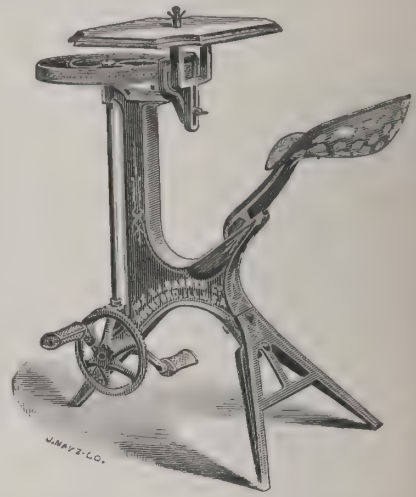
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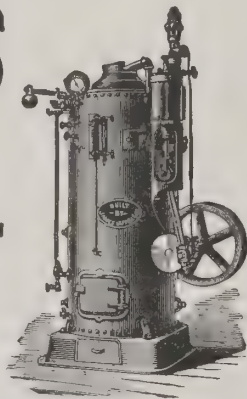
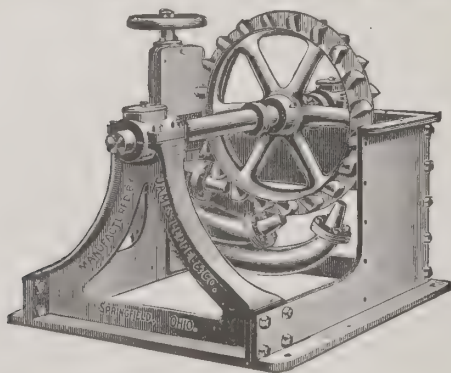
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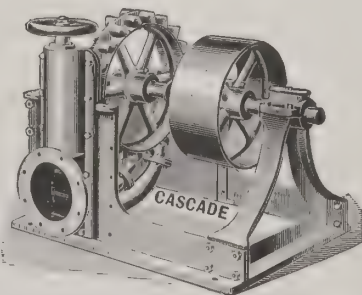
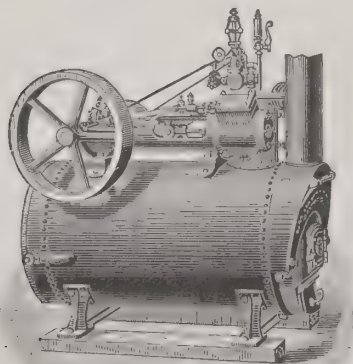
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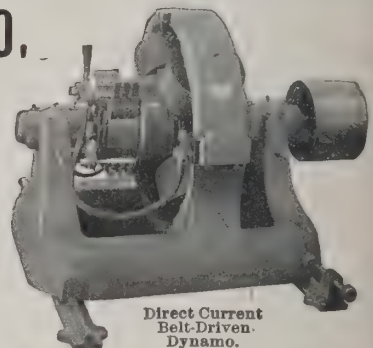
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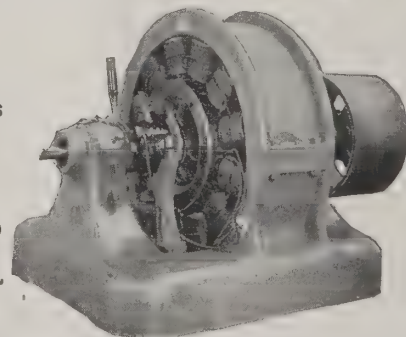
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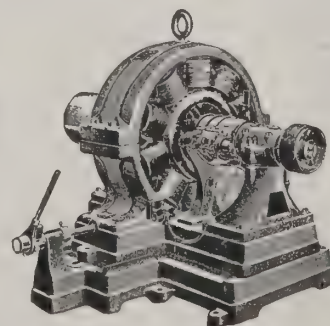
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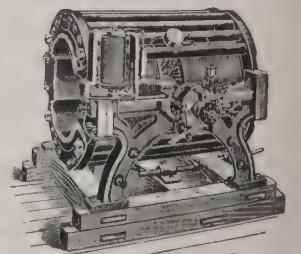
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### Aluminum-Coated Steel Sheets.

W. J. WILDER, of St. Louis, the inventor and patentee of the process of coating steel sheets with aluminum says that the same is at last being worked on a commercial scale, and with results so entirely satisfactory that there can be no question as to its practicability. Mr. Wilder has been engaged for thirty-five years in the manipulation of metals, and for several years past has devoted himself closely to study and experimentation in the effort to produce a substitute for galvanized iron which should be superior to the latter, especially in the matter of a durable coating, and yet at a cost which should approximate that of galvanized sheets. In the course of this work he has visited quite a number of the larger of the galvanizing plants in this country to ascertain if any important improvements had been made on old-time methods of treating the sheets. He found that there had been some slight changes in the manner of coating with spelter; that there were some little differences in the so-called pot that contains the molten metal, and that some establishments were able to turn out work faster than others, but the process for pickling and preparing the sheets is about the same as ever, though the machine process for pickling be found to work faster and with less expense than pickling by hand.

Another thing which impressed him was, since steel has come into general use, galvanizing has been rendered more difficult; this because steel, being "fine grained," so to speak, and spelter being a coarse metal, the latter is prevented from entering the pores of the former. As a result the coating flakes off from the finished sheet when it is bent. With aluminum-coated sheets this is not the case. Such sheets can be worked and seamed without peeling to any extent whatever.

Another marked advantage possessed by the aluminum-coated product is that it may be brought to a red heat without destroying the coating. This improvement over galvanized material will be especially valuable where smokestacks, stovepipe and chimney tops are concerned, which are subject to burning out from time to time; in the case of boilers where expansion and contraction takes place, and also for eave troughs, conductor pipes, etc. Mr. Wilder has quite a few interesting samples of aluminum-coated sheets in his office which have successfully withstood various severe tests. Among them are some steel sheets which have been coated, first with aluminum and then with copper, and which suggest by their general excellence of appearance and quality, as well as by the cheapness with which they can be produced, a future competitive article with all copper sheets.—*Ex.*

### High-Priced Labor the Cheapest.

MR. A. B. FARQUHAR, of York, Pa., has pointed out to the Ways and Means Committee of the present United States Congress that labor is best benefited by increased sales of its products abroad and in no way receives better pay than when employed in the manufacture of exportable goods in direct competition with foreign labor, "wages remaining high, though the price of the product is low and really cheaper because directed by higher brain power."

This fact—that the unit of production is lower in the United States than elsewhere because of the greater working capacity of American labor—is one that is utterly lost sight of in the ordinary discussion of the so-called cheaper labor of Europe. The American workingman is paid higher wages, but he produces so much more with the aid of improved machinery and his work is of so much better quality that his labor is really cheaper than that of any of his foreign competitors.

An English paper, in commenting on American bicycles and their relation to the export trade, makes the interesting admission that the high price of labor, which some think a drawback, is really an advantage, because high-priced labor is so efficient and its ingenuity in the devising and manipulation of machinery is so highly developed that the labor cost of the completed article is less than it is with lower priced labor working under less favorable circumstances. It also estimates that, unless there is some check in the demand, from 40,000 to 50,000 cycles of high quality and of American make throughout will be offered in the English market before the close of the season of 1897.

—A number of satisfactory orders for brass and iron goods for steamfitters has recently come from Japan. Two contracts for wrought-iron pipe, said to be of importance, were recently closed. The deliveries of the goods on these contracts are to be made during March and April.

### American Machinery Abroad.

THE increasing export of American machinery is one of the more special features in the recent remarkable expansion of its foreign trade. The causes for this are not remote or obscure. It has for some time been apparent to all watching the progress of the world in mechanical science that in many forms of labor saving appliances the leadership in efficiency was passing into American hands. In lightness and economy of construction, ease and simplicity of manipulation, rapidity and accuracy of work, and in general attractive appearance, the American article is confessedly equal to the best and superior to most. Native ingenuity has been prompted to its best endeavors by the incessant demand for economical and rapid methods of production. Competition and the ambition to excel has been a spur in the side of invention, while the enormous resources of the country have been an effective point in the rowel. From a reaper to an auger, a locomotive to a bicycle, and a printing press to a sewing machine, the same broad mark of ingenuity has been royally stamped. The result is now showing itself. Everybody is inquisitive regarding the American machine. It is expected to be out of the old rut, and to be more ingenious, even if less stable, than its competitors. The ground has been broken and the seed sown for the harvest now in sight. The increase in exports of machinery was more or less general, though the United Kingdom, Australasia and our Canadian neighbors were by far the largest buyers. During the eleven months of 1896 the increase over the entire year of 1895 is placed at \$7,302,970, and of this sum Great Britain paid \$2,000,000 of the total. Of bicycles the same customer bought more than two-thirds of the whole product. Of the steamers sailing regularly from New York to South African ports we note the shipment by a single house of thirteen carloads of mining machinery. These facts are encouraging to all American manufacturers of machinery, as indicating their possibilities in foreign markets. With the world at peace, and its energies focussed in industrial enterprises for one year before the doors of Janus close, the expansion of American foreign trade will be more astonishing in 1897 than in 1896.—*Age of Steel.*

### A "Lift" for the President of Mexico.

THE WARNER ELEVATOR MANUFACTURING COMPANY, Cincinnati, O., are constructing an elevator for President Diaz of Mexico, which, it is said, will be one of the most unique affairs of the kind in the world. The Palace of Chapultepec, city of Mexico, the president's home, is situated on the top of a hill of solid rock. The only approach to the top of this is by a driveway that encircles it and is difficult of access. In order to afford an easy means of reaching the palace from the ground, particularly for passengers, a shaft about 6 feet square has been cut through the solid rock 140 feet to the top. It is in this shaft that the elevator will run, being operated by hydraulic power from an artificial lake on the hill 160 feet from the entrance to the elevator. This entrance is also within a deep grotto cut in the rock some distance in order that the lift may be entirely perpendicular. At the top of the shaft a court has been constructed that forms in reality a part of the palace, so that the president and his family, for whose especial use the elevator is constructed, can step out of the car directly into the house. The elevator is made of iron and brass, the car being made of oxidized copper and ornamented by twelve plate-glass mirrors.

### The Steel-Rail Market.

OWING to the recent collapse of the steel-rail pool in this country all sorts of reports as to orders and prices are current. Quotations for steel rails are from \$18 to \$14, the latter Pittsburg delivery, and it is asserted that at \$17 all the rails that can be bought may be obtained. This, it is argued, should mean the equipment of every railroad for at least two years. Large orders are looked for from Japan, South America, Mexico and other purchasing countries. The Illinois Steel Company is said to have closed on orders for \$5,000,000 worth of steel rails, with the condition that the orders may be doubled on the concession rates. With such demands on the resources and capacities of the mills their ability to fill orders may soon end, and rails may be quoted higher than before the collapse of the pool.

—Machinists are trying to introduce glass bearings for machinery by imbedding them in elastic supports. In ordinary use, where correctly applied, they require less oiling, develop less friction, and are undoubtedly useful in many places, and there may yet be extended use for them.



### New Railroad Car Axles.

WORKS have been established at Beaver Falls, N. Y., for the manufacture of steel axles by an entirely new process invented and patented by John T. Rowley. The machinery for the plant has just been finished by a Pittsburgh concern.

The principal machine is an immense roll weighing thirty tons, and in this machine lies the new process that is to be used. Heretofore axles have been forged lengthwise, and afterwards the taper and shoulders had to be put on. By the new process the billets will be rolled to about the desired size, after which they will be placed in the rolls edgewise. One roll will press them against a hauser, or die, which will form the axle into the exact shape required. Immense saws will cut the axles to within a sixteenth of an inch of the length desired, and they will then be finished with an ordinary facer. The plant will have a capacity of 250 finished axles a day, and will be ready to commence operations by the 10th of February. The company expects to secure the contract for furnishing all the axles for the Pennsylvania Railroad.

### American Goods in Sweden.

TWO years ago P. S. Peterson presented the Swedish Government a collection of American tools and models worth several thousand dollars. This collection was placed on exhibition in Stockholm, and became known as the Rose Hill collection. The models and tools were extensively copied, and the benefit received from the collection by the Swedish industrial and manufacturing interests has been so great that it created the idea of a permanent industrial and commercial exhibition, particularly with reference to Sweden's trade with the United States. The new exhibition is known as the "Industrial and Commercial Museum," and was opened December 14th last. American and foreign manufacturing houses will be permitted to exhibit their products free of charge, and the Swedish Government may admit free of duty all articles intended for the museum.

### A New Garbage Crematory.

THE new invention of J. C. Anderson for destroying garbage has been given a three months' trial in Chicago, and has proven so successful that the City Council has asked the State Legislature for permission to enter into a contract for its use. New York authorities are also considering it. The machine is patterned after the Anderson brick tunnel, which Mr. Anderson invented several years ago, and which is now in such general use. The scheme is to load the garbage on fireproof cars, which pass through a concrete tunnel (in which is a double track) in opposite directions. At the centre of the tunnel the garbage is reduced by being heated to a white heat, and each car going out gives an intense heat, which dries out the garbage on an incoming car. Mr. Anderson has also invented a pneumatic poker which is used to stir up the garbage on these cars while passing through the tunnel. It consists of compressed air being driven through a steel tube, with a small addition of petroleum. He has taken out over 100 patents on brick machines and bricks.

### A Snow Plow for Roumania.

ANOTHER of the famous rotary snow plows, justly termed the champion plow of the world, recently completed at the Cooke locomotive works, Paterson, N. J., was shipped on January 9th to the government railroads of Roumania. The latest plow built at these works is a great improvement over the ones turned out in years gone by. For eight years the company has been experimenting with various improvements, and by dint of much labor and expense has perfected a machine which railroad men the world over say never had an equal. For work it completely puts in the background the old wedge plow, which has caused so many accidents and loss of life in its use with big snow drifts. The rotary snow plow weighs over 122,000 pounds.

A FINE export trade is in process of extended development by the manufacturers of builders' hardware in the United States. For the first eleven months of 1896 foreign shipments aggregated \$5,587,548, over a million dollars in excess of the preceding year. In the month of November alone there was an average monthly increase of over 50 per cent. Great Britain was the largest consumer abroad and Mexico on the Western Continent, the latter country nearly doubling its average demand. The increased foreign sales in this branch are not exceptional. There has been improvement along the whole line, so marked that it has arrested very general attention and created inquiry as to operating causes. The markets of the world are none too wide a scope for the fruits of American skill and industry.

—An export firm this month sent to London a good-sized shipment of hydraulic jacks and other special railroad tools. They claim that their shipments last year for special railroad supplies were larger than for five years past. According to present indications a considerable quantity of iron working tools will be sent to English markets from the United States this year. "In referring to these tools," said the exporter, "we do not mean to infer that bicycle tools are included. This class of American machinery, it is well known, leads all foreign makers, and their principal export markets are in Europe."

—The United States stands first in power utilization at present, but it is our fault if our own waste energies do not soon prove to us what water power has proved to the Americans.—*London Electrical Review.*

### Machinery Notes.

—Montevideo received from New York during November 8,660 pounds of leaf tobacco.

—A good-sized order for cedar tanks for shipment to Australia has been secured by a Philadelphia concern, which was the lowest bidder.

—It is reported that H. C. Dayton & Co., New York, are about to ship ten freight cars to Nicaragua, and that similar shipments will follow.

—Several docks in Central and South American, West Indies and Mexican ports are using considerable quantities of American submarine compounds.

—Two carloads of furniture containing principally chairs and tables will leave this port by sailing vessels for Northern Brazil during the month of January.

—An oil-well plant was recently shipped to Singapore by prominent export merchants. The shipment consisted of forty carloads of machinery valued at \$50,000.

—A Chilean order for railway supplies amounting to \$16,000 was recently received. Its leading items were jacks, rail benders, picks, crowbars, shovels and some car parts.

—Over 1,100 applications for patents on bicycles and their fixtures have been received at the Patent Office at Washington in the last ninety days, and of these 550 were for improvements in tires.

—It is said that the electric-lighting plant for the new Waldorf Hotel, New York, will be the largest isolated plant in the world. It is to run regularly 25,000 lights, and will be capable of running 50,000, or enough for a good sized city.

—The Russian Minister of Transportation has asked for about \$5,000,000 for building new lines of railroad during the current year. It is said that orders will shortly be placed for 455 locomotives, 300 passenger cars, 10,000 freight and 200 tank cars.

—The Baldwin Locomotive Works, of Philadelphia, recently shipped per steamer Mogul, for Kobe, Japan, fifteen large locomotives, to be followed by forty-four additional locomotives by steamer Fortuna. These, we are told, are the heaviest locomotives yet shipped, and are for use on the Northern Japanese Railway.

—Ball bearing car wheels are now being used on ore cars in some of the mines on the Menominee Range. It is stated that one man can easily push a car which would require three or four men if fitted with the usual wheel and bearing. It is the intention of the patentee to also apply his invention to heavy freight and passenger cars.

—The Bradford Mill Company, of Cincinnati, Ohio, have booked several orders for foreign shipment of their engine lathes. Among these orders is one for forty-five lathes to Stockholm, Sweden; one for 100 lathes for Berlin, Germany, and one for two lathes for the Exposition Building at Brussels. Several orders from home concerns are also reported.

—Canadians want American machinery to be relieved from paying duty when it crosses the border. They recognize the fact that American shoe machinery, for instance, is indispensable, and they realize that the 35 per cent. duty which is imposed by Canadian customs is a severe handicap on their factories. It looks as though reciprocity with Canada was getting nearer every day.

—Two of the leading export firms to South Africa say that lately some satisfactory orders for manufactured iron goods have been received from that market, but thus far they do not compare favorably with those sent to England. In machinery, it was added, this country is doing more business every year, and it would not be surprising if this year they do as much as their competitors abroad.

—The iron-pipe trade of the great South African country has developed extensively the past few years. American enterprise has recently scored a point by the American Tube and Iron Company, of New York, receiving orders from there. A shipment of four carloads was forwarded early in the month of January. The second order will consist of about twenty carloads of their Matheson patent lock-joint pipe.

—A New York export firm will soon ship to Buenos Ayres a considerable quantity of machinery. The principal items in the shipment are an equipment for a brickmaking plant, also one for a shoe manufacturing establishment and a full set of apparatus for two bakeries, making both crackers and bread. While none of the plants are on such a large scale as those of the kind in this country, they are larger than similar plants that have been sent to South America.

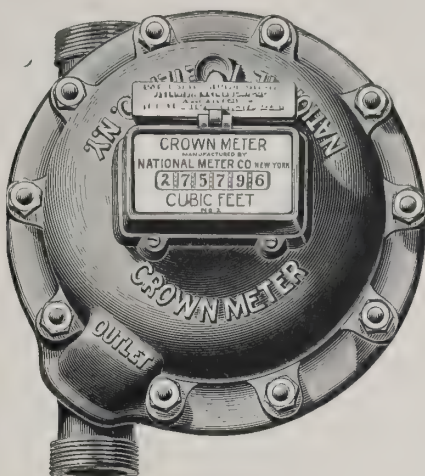
—A material known as "fibre conduit" seems to be coming into extensive use for many services where cast iron pipe has heretofore been employed, and is worth investigating for various shop uses. It is used for water, gas and sewer purposes. Not for steam. It is light, tough and strong, is butted together with a continuous smooth interior, making very tight joints, and does not expand with heat or cold. It is, besides all else, a perfect electrical insulator.

—For some time past orders from Australia for American hardware are reported to have been very large by reason of the unusually large amount of building being done in that country. The large increase in building is caused by the increased demand to accommodate the newcomers. This boom has increased the cost of building materials, the increase averaging not less than 25 per cent. American hardware and building materials are largely used in this, the demand being unusually heavy. The American manufacturers of hardware, nails, etc., are able, by the use of newly invented machinery, to manufacture and sell their products at very low prices.



Interesting Information for Water Works Officials about

# WATER



# METERS

They measure correctly the amount of water passing through a pipe.

They increase the revenue,  
Restrict the waste,

and assist in maintaining a uniform pressure in the water main.



We have many letters of similar character, copies of which we would be pleased to mail you.

## NATIONAL METER CO.

298 BROADWAY, NEW YORK.

The Largest Water Meter Manufacturers in the World.  
Over 176,000 in Service.

[FEBRUARY, 1897.]

City of Highland Park, Illinois.

NATIONAL METER CO.,  
298 Broadway, New York.

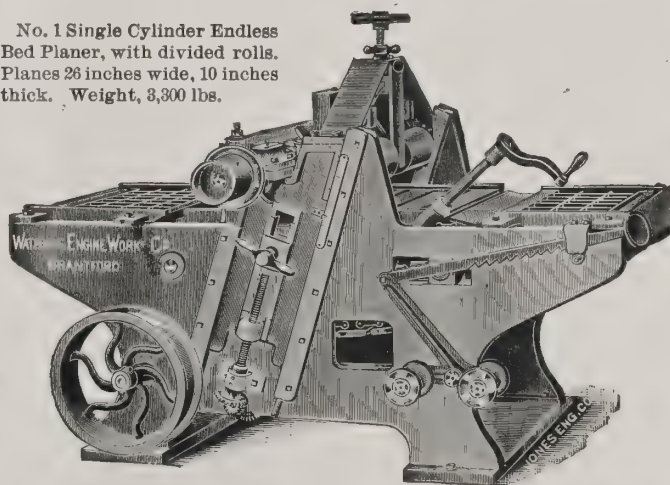
GENTLEMEN:

Replying to your favor of the 3d inst., would say that the city of Highland Park adopted the meter system in their water works in the winter of 1894-95. The result has been a material increase in revenue from the system, and a decrease in pumpage of at least 40 per cent. The water takers are well pleased with the service, as each pays for what he actually consumes. The city derives another advantage from the fact that leakage is quickly discovered, thereby increasing the economy of operating the system. Our experience has fully satisfied the most skeptical that meters soon pay for themselves in increased revenues on the one hand, and reduced cost of operating on the other.

Yours very truly,

J. C. CUSHMAN.  
Chairman of Water Committee.

No. 1 Single Cylinder Endless Bed Planer, with divided rolls. Planes 26 inches wide, 10 inches thick. Weight, 3,300 lbs.

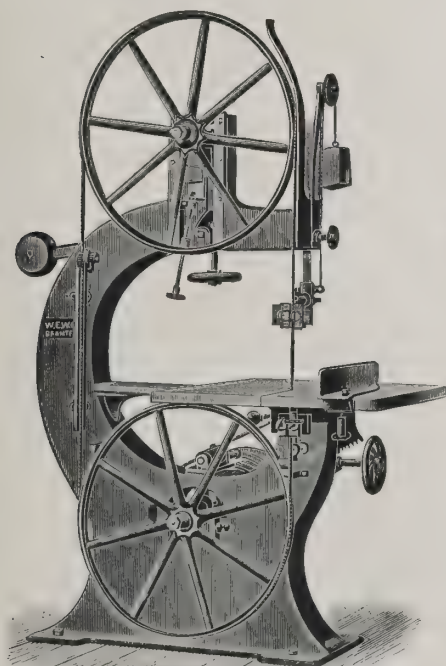


## Wood-Working MACHINERY.

No. 1 E. B. Planer. Weight, 3,300 lbs.; like cut.  
No. 1 Double Cylinder E. B. Planer. Weight, 5,300 lbs.  
No. 2 E. B. Planer. Weight, 2,600 lbs.  
"Champion" Combined Planer, Matcher and Moulder. Planes 24 inches wide up to 6 inches thick. Best all-around machine.

MANY OTHER STYLES AND SIZES,  
AND FULL LINE OF  
WOOD-WORKING MACHINES.

Long experience in the export trade is a satisfactory guarantee.



No. 3.—36-inch Wheel. Weight, 2,000 lbs.

## BAND RE-SAWS.

No. 5 Band Resaw.—48-inch wheels; saws 24 inches wide, 5 to 40 feet per minute. Resaw swings clear of machine when required. Weight, 4,500 lbs.

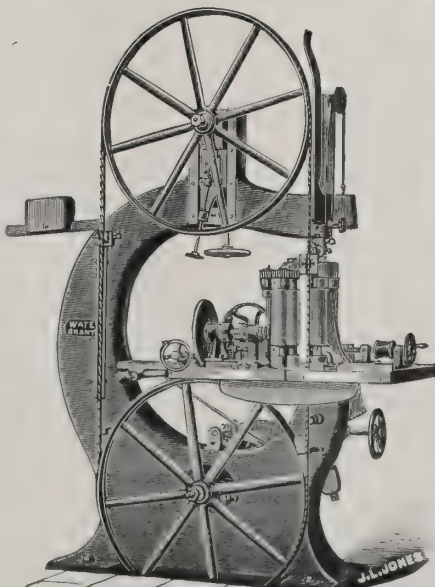
No. 6 Band Resaw.—48-inch wheels; takes saws to 3 inches; cuts 30 inches deep. Weight, 4,300 lbs.

No. 7 Band Resaw.—54-inch wheels; 4-inch saws; cuts 30 inches deep and to center of 10 inches. Weight, 5,300 lbs.

OTHER SIZES MANUFACTURED.

FULL LINE OF

Saw Mill Machinery.



No. 4.—40-inch Wheels and Removable Resaw. Weight 2,750 lbs.



1844.

NEW  
PREMISES.

1896.

January, 1896, we moved into new premises, securing unsurpassed facilities for executing contracts promptly and satisfactorily. Order direct or through your commission house, sending us copy of order.

Saw Mill Machinery Our Specialty.

There are some 300 of our saw mills running in South and Central America, Europe, Asia and Africa, of different sizes, from those cutting logs 6 feet in diameter to small mills sufficiently portable for mule-back transport.

# WATEROUS, BRANTFORD, CANADA.



### Some Remarks on American Packing.

(By Our Special London Correspondent.)

LONDON, January 25, 1897.

ONE of the most important things to consider in conducting an export trade is efficient packing, and in this direction American manufacturers take a high place. Of course there are firms in the United States who send out goods poorly packed, but the same thing goes on all over the world. No nation is exempt from such exceptions, but as a rule the Americans may be congratulated on their success in this department. It is also one of the most reassuring things for a foreign buyer to know that his goods will arrive in proper condition under ordinary circumstances, and that he will be relieved of all further trouble on this score.

Let us take the case of hardware first. Well, we find that Bradford (Eng.) importers are of opinion that American tools are shipped with great care, each piece being wrapped, especially if they are of fine finish, in soft paper or cloth. Shears and cutlery of United States origin arrive there in fine condition. From Glasgow (Scotland) there comes much the same answer. During the last three months there have been received at this port from the United States agricultural machinery, pumps and pumping machinery, etc., packed in wooden cases. Files, small castings, wrenches and other small tools have also been recently imported from the United States, all coming in wooden cases without hurt or damage.

If any district is entitled to speak about hardware and cutlery it is Sheffield. What do we find their opinion to be? Why, that the American method of packing such lines gives general satisfaction. Tailors' shears and scissors are put up singly in paper bags, then placed in cardboard boxes—shears one pair in a box, scissors six pairs in a box. Saws, hand tools and hardware generally are, before packing in case, put up in paper boxes. Where the hardware will not allow of this it is wrapped in heavy paper and then securely packed.

Now, let us take a long voyage as far as New Zealand, and hear what they have to say there. The hardware importer in Auckland says that "the American system of packing goods is far preferable to all others." The unmistakable consensus of opinion among importers of American goods is that the packages and packing are greatly superior to any foreign packages from countries doing business with this colony. There is general satisfaction expressed on all sides as to the perfection and stability of American packages. The leading importers at Dunedin and Christ Church told the Consular agents there that the packing of American goods which arrive at those ports is such that there is scarcely any room left for improvement. Especial reference, too, was made of reapers, mowers, binders, lawn mowers, lamps and lampware, etc.

The importers of Madras have no complaints to make against American packing, which they consider is equal to that of European goods.

Coming near home, namely, to British Columbia, the merchants there are unanimously of opinion that the present manner of packing American goods gives perfect satisfaction. No one has been able to suggest any improvement. "All say that Americans are the neatest and best packers in the world."

One of the leading importers in Bermuda says he finds that Americans pack shelf goods in hardware lines much better and cheaper than do most of their foreign competitors. The cost of packing is much in favor of the American article. He adds: "I find that the American catalogues are very much better illustrated, which in many instances give the American goods the preference, although other goods may be as good and a little cheaper. In ordering from European catalogues, owing to their not being well illustrated and numbered, I often get something entirely different from what I ordered, and in many cases making dead stock. Europeans are much behind the times in their illustrations. They furnish the dealer with six or eight little books representing as many different lines of hardware very poorly classified, while the American gives all in one well-illustrated book, making it easier for the dealer to make selections and also make certain that he will receive just what he ordered."

Let us go to Chili (Iquique) and see what they have to say. The American Consul at that place said that fifteen years ago he had occasion to repeat the complaints of merchants of that city on account of the style of packing American goods. The complaints were then well founded. "Since then a complete revolution has taken place in this respect. Leading merchants in various branches of trade have assured me that no goods come better packed than those from the United States."

The importers in Brussels (Belgium), while indifferent on the subject, for some occult reason known to themselves, declare that if exporters from other countries displayed the same careful attention in packing their manufactures as is exercised by the American exporters they would be entirely satisfied. And so I might go on piling opinion upon opinion, all from practical business men who have to deal with these matters every day of their lives. There must be truth in it. It is impossible that people all over the world can be found to lie merely to tickle the vanity of a great nation. Such a supposition is absurd. The truth is that America has during the last fifteen years been going in more and more for a foreign trade and has consequently become more and more skillful and adept in catering for her customers. The English manufacturers and export merchants also pack goods for shipment abroad with extra care, but still many of them could pack more closely and securely than they now do. It should always be borne in mind that next to quality of the goods the package containing the same should be considered in order that the buyer may be satisfied.

—Several contracts have been made recently between paper mills and a leading Mexican exporter to furnish the latter a number of tons of newspaper each month. Considerable quantities of wrapping paper will also be sent by the same concern every month.

### An International Silver Coin.

THERE have been various plans suggested for a common silver coin representing a standard of value for all of the countries interested—a sort of trade dollar—which would be legal tender in international commerce and have the same fixed value everywhere. When a man bought a cargo of wool in the Argentine Republic for \$100,000, for example, he would not have to cable to inquire whether that meant Argentine dollars or United States dollars, but would know at a glance that the price was quoted in the international dollar, which had the same value compared with gold in the Argentine Republic as in the United States. It has been suggested that Great Britain, Germany and other European countries would not enter into any such compact. It would be very much better for the United States if they did not, because if they refused to receive the common coin in exchange for merchandise the importers of the southern countries would buy their goods elsewhere. The scheme would also absorb a large amount of the silver product every year. The only countries covered by Mr. Beach's resolution that produce silver are Mexico, Colombia, Ecuador, Peru, Bolivia, Chili and the United States, and most of the bullion for the other nations might be furnished by the United States and the coining done here.—*Philadelphia Ledger*.

ONE of the leading Wall street export firms, identified with the Japanese and Chinese business, said when questioned about the prospects of future business in Japan: "There can really be no improvement in Japanese business; they have already extended their commercial relations beyond their means, and if the government does not take a hand in the many private enterprises now on foot it will be surprising if there are not some serious financial difficulties within two years. We are receiving inquiries by every mail for all sorts of improved machinery, railway supplies and many other manufactured goods. While the shipments are quite heavy from the United States, they do not, however, compare with those of England in many of the manufactured articles. We have at present advices of two new railroads, but until we have further details we do not feel justified in giving information. There are any number of enterprises on foot in Japan at present, and, as we have said, if they do not stop the pace at which these enterprises have been going the results will be disastrous."—*Journal of Commerce*.

HENRY R. WORTHINGTON has just been awarded a contract by the city of Chicago covering six vertical triple expansion direct-acting high-duty pumping engines, each of 20,000,000 gallons daily capacity. This contract amounts to \$437,600, and is the largest contract for waterworks pumping machinery ever placed in this country. The above six engines each has a daily pumping capacity of 20,000,000 gallons against a head of 150 feet, and will be supplied with steam at a pressure of 140 pounds to the square inch. The engines will each be of 530 horse power. This company is also building three vertical triple-expansion direct acting high-duty pumping engines for the city of Brooklyn, N. Y., under a contract amounting to \$385,000. These engines each has a daily capacity of 20,000,000 gallons to be delivered against a head of 168 feet, and the steam will be supplied at a pressure of 135 pounds to the square inch, each engine being of 600 horse power.

—Sanders Brothers, of Stafford, N. Y., who deal largely in produce, have sold a consignment of 10,000 bushels of barley to a firm in Russia. It will be billed direct.

—The Chicago Pneumatic Tool Company, of Chicago, received this month an order from London, England, for forty of their "A" size hammers, to be shipped during the months of January, February, March and April.

—The Carnegie Steel Company (Limited), Pittsburg, Pa., has opened offices in London and Liverpool, England. It is stated that it is the intention of the company to compete with the British for contracts in all colonial countries, Japan, China, Russia, and wherever else the British have a market on their own ground.

—The Tennessee Coal, Iron and Railroad Company on January 10th sold 5,000 tons of iron to Antwerp, Bremen, Genoa and Rotterdam. This brings the total sales of this company and the Sloss Company to European points since August last to 80,000 tons, of which the Tennessee company sold 51,000 and the Sloss Company 29,000 tons. A sale of 10,000 tons has also been made to Yokohama.

—A new phase of the wood-pulp industry is developed in the manufacture of paper tiles for roofing purposes, which are known to the trade as Norway tiles. They are pronounced superior in quality, appearance and price, and the insurance companies appear favorably disposed and stamp the tiles as a very desirable and safe roofing material. Some of the qualities presented by this new factor in the line of building are its light weight, exceeding hardness, a non-conducting of heat and sound, and sufficient elasticity to meet all the requirements.

—It is interesting to note in the export business of American wood pulp news paper, that the largest and liveliest demand for it comes from England and especially from London—a fact which nobody would have believed ten years ago to be even a future possibility. There is also a steady demand now for American paper from Mexico, South America (Buenos Ayres particularly), and even from Australia. Were the white paper on which they are printed to be made again as dear as it used to be before the advent of wood pulp, probably not fewer than 90 per cent. of all the American newspapers that amount to anything would be forced to double their rates or suspend publication.—*Hartford Times*.





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Every part constructed of best known materials and workmanship

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Water Closet,

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MANUFACTURER OF

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for wooden bottoms.

"Marine Iron" Paint

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iron or steel vessels.

Tarr's Celebrated

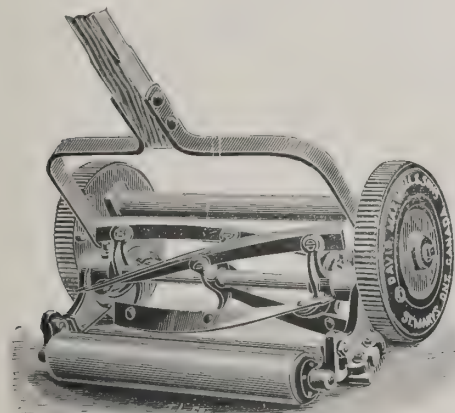
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These Paints are acknowledged the best manufactured for their respective uses.

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## MAXWELL LAWN MOWERS.

HIGH AND  
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The Latest and Most Perfect in the Market.

IMPROVED FARM MACHINERY  
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Manufacturers,  
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The Largest Manufacturers of Playing Cards in the world.

### "U. S." Playing Cards.

No.	First Quality	Per doz.	Per gro.
808. Bicycle Cards	Ivory finish, highly enameled; used all over the world; sales exceed all other makes.	\$1.05	\$12.60
188. Capitol	Double enameled, high finish; Club cards.	1.40	16.80
202. Sportsman's	Extra enameled; for sporting Clubs.	2.00	24.00
303. Army and Navy	All linen; for Clubs.	2.40	28.80
89. Treasury	Finest linen; for Clubs and particular players.	3.00	36.00
39. Trophy Whist	French size, 2 1/4 x 3 1/2; Fine finish; large indexes; new brand.	2.00	24.00
93. Ivory Whist	German size, 2 1/4 x 3 3/4	2.00	24.00
155. Tourists	hard finish; for general stores	.70	8.40
45. Texan	enameled; for general stores.	.90	10.80
95. Spanish Cards	Spanish size, 2 3/4 x 3 3/4; Forty-eight cards; finest parchment stock; hard surface finish; permanent colors; superior to the finest Barcelona cards.	2.00	24.00

### "National" Playing Cards.

22. Rambler	hard process finish	.70	8.40
33. Apollo	enameled, aluminum surface	.85	10.20
133. Columbia	French size, 2 1/4 x 3 1/2; enameled.	1.05	12.60
144. Tennis	French size, 2 1/4 x 3 1/2; enameled.	1.80	21.60
75. National Club	regular size, 2 1/2 x 3 1/2; finest Club Cards	2.50	30.00

TERMS: Cash f. o. b. vessel New York, less 2% for shipments of not less than three gross.

Makers of over 1,000 different kinds of  
Playing Cards. Received "HIGHEST  
AWARDS" at World's Fair, Chicago.

The United States Playing Card Company,  
CINCINNATI, U. S. A.

## C. A. WOOLSEY PAINT AND COLOR CO.

98, 100 and 102 Hudson St.,

JERSEY CITY, N. J., U. S. A.,

MANUFACTURERS OF

Woolsey's Copper Best Paint,

Woolsey's Domestic Kalsomine,

Woolsey's Coach and Car Colors,

Woolsey's Wood Stains, Wood Filling, etc.

### Copper Best Paint

FOR THE PRESERVATION OF THE  
BOTTOMS OF WOODEN  
VESSELS.

#### TESTIMONIAL.

From DEVONPORT FERRY CO., Ltd  
Auckland, N. Z., May 20, '91

To C. A. WOOLSEY PAINT  
AND COLOR CO.,  
Jersey City, N. J., U. S. A.

Gentlemen—I have great pleasure in recommending Woolsey's Copper Best Paint. I have used it on my Company's steamers for a number of years past, and it has given entire satisfaction.

The Devonport Ferry Company's steamers "Britannia," "Victoria," "Alexandra," "Taka-puna" and "Tainui" are now coated with Woolsey's Copper Paint over Metal Sheeting.

Faithfully yours,

ALEX. ALISON, Manager.

### "KALSOMINE."

Our Kalsomine is made of the best selected material and the tints and colors are particularly brilliant and clear. We are selling large quantities in the foreign markets with gratifying results. Send a sample order. You can make no mistake, for it is the best Kalsomine in the market.

### COACH

—AND—

### CAR COLORS.

GROUND IN JAPAN.

#### TESTIMONIAL.

CHARLOTTE, MICH.,  
March 17, 1890,

C. A. WOOLSEY,

Dear Sir:—We have used your colors for the last two years and we like them better than any we have ever used. Your Black, Wine and Greens are very fine colors, being very finely ground and having a good strong body. Your Ruby Red, we think, is the finest Red in the market, and full as nice as Carmine.

Yours truly,

MAT & BARNEY.

## B.F. BROWN & CO.



Manufacturers of the Celebrated

## FRENCH DRESSING

AND

## SATIN POLISH

FOR

LADIES' AND CHILDREN'S  
BOOTS AND SHOES.

MANUFACTURERS OF

## ARMY and NAVY BLACKING.

Boston, Mass. London, Eng.





### The Anglo-Venezuelan Treaty.

THE *Public Ledger* of Philadelphia published the following account of the signing of this treaty at Washington on the 2d of this month: "The Anglo-Venezuelan arbitration treaty was signed by Sir Julian Pauncefote, the British Ambassador, and Senor José Andrade, the Venezuelan Minister, in the office of Secretary Olney, at the State Department, at 4:30 o'clock this afternoon (February 2, 1897), signaling the amicable termination of a controversy that has lasted nearly a century, as well as the resumption of diplomatic relations between the two countries, which had been suspended for ten years.

"The British Ambassador, accompanied by Mr. Henry Outram Bax-Ironside, Attaché of Embassy, reached the Department just before 4 o'clock, and a few minutes later the Venezuelan Minister appeared with Mr. Manuel M. Ponte, Jr., Secretary of Legation, and James Mr. J. Storow, the counsel of Venezuela before the Commission and the Arbitration Tribunal.

"Senor Andrade brought with him a magnificent pen, with which the important document was subsequently signed. It was sent to him by his brother, who, it is universally conceded, will be the next President of the Venezuelan Republic, and to whom it will be returned as a souvenir. It consisted of a gold pen, fastened in a holder made from an eagle's quill, bearing, midway from the tip, a gold heart encrusted with diamonds. While the two plenipotentiaries were formally exchanging their credentials the copies of the treaty, which were printed, were carefully compared by Mr. Bax-Ironside and Mr. Cridler, Chief of the Diplomatic Bureau of the State Department, who had made all the drafts of the documents and printed the copies. These were in the English language, Spanish not being used, although the tongue of Venezuela, the only difference being that in the Venezuela copy that country is mentioned always first and the British vice versa.

"The British Ambassador signed 'Julian Pauncefote' to both copies: Senor Andrade, following, affixed his signature, and Mr. Cridler affixed their respective seals. The formalities having been quickly completed, there was a general exchange of congratulations, which were pressed upon Secretary Olney with particular cordiality, and before 5 o'clock the negotiators had returned to their official residences."

#### FULL TEXT OF THE TREATY.

The full text of the Anglo-Venezuelan treaty follows:

Her Majesty, the Queen of the United Kingdom of Great Britain and Ireland, and the United States of Venezuela, being desirous to provide for an amicable settlement of the question which has arisen between their respective governments concerning the boundary between the Colony of British Guiana and the United States of Venezuela, have resolved to submit to arbitration the question involved, and to the end of concluding a treaty for that purpose have appointed as their respective plenipotentiaries:

Her Majesty, the Queen of the United Kingdom of Great Britain and Ireland, the Right Honorable Sir Julian Pauncefote, a member of Her Majesty's Most Honorable Privy Council, Knight Grand Cross of the Most Honorable Order of the Bath, and of the Most Distinguished Order of St. Michael and St. George, and Her Majesty's Ambassador Extraordinary and Plenipotentiary to the United States;

And the President of the United States of Venezuela, Senor José Andrade, Envoy Extraordinary and Minister Plenipotentiary of Venezuela to the United States of America;

Who having communicated to each other their respective full powers, which were found to be in due and proper form, have agreed to and concluded the following articles:

ARTICLE I.—The Arbitral Tribunal shall be immediately appointed to determine the boundary line between the colony of British Guiana and the United States of Venezuela.

ARTICLE II.—The tribunal shall consist of five jurists—two on the part of Great Britain, nominated by the members of the Judicial Committee of Her Majesty's Privy Council, namely, the Right Honorable Baron Herschell, Knight Grand Cross of the Most Honorable Order of the Bath, and the Honorable Sir Richard Henn Collins, Knight, one of the justices of Her Britannic Majesty's Supreme Court of Judicature; two on the part of Venezuela, nominated, one by the President of the United States of Venezuela, namely, the Honorable Melville Weston Fuller, Chief Justice of the United States of America, and one nominated by the Justices of the Supreme Court of the United States of America, namely, the Honorable David Josiah Brewer, a Justice of the Supreme Court of the United States of America, and of a fifth jurist to be selected by the four persons so nominated, or, in the event of their failure to agree within three months from the date of the exchange of ratifications of the present treaty, to be selected by His Majesty the King of Sweden and Norway. The jurist so selected shall be president of the tribunal. In case of the death, absence or incapacity to serve of any of the four arbitrators above named or in the event of any such arbitrator omitting or declining or ceasing to act as such, another jurist of repute shall be forthwith substituted in his place. If such vacancy shall occur among those nominated on the part of Great Britain the substitute shall be appointed by the members for the time being of the Judicial Committee of Her Majesty's Privy Council, acting by a majority, and if among those nominated on the part of Venezuela he shall be appointed by the Justices of the Supreme Court of the United States, acting by a majority. If such vacancy shall occur in the case of the fifth arbitrator a substitute shall be selected in the manner herein provided for with regard to the original appointment.

ARTICLE III.—The tribunal shall investigate and ascertain the extent of the territories belonging to or that might lawfully be claimed by the United Neth-

erlands or by the Kingdom of Spain, respectively, at the time of the acquisition by Great Britain of the colony of British Guiana, and shall determine the boundary line between the colony of British Guiana and the United States of Venezuela.

ARTICLE IV.—In deciding matters submitted the arbitrators shall ascertain all facts which they deem necessary to a decision of the controversy, and shall be governed by the following rules, which are agreed upon by the high contracting parties as rules to be taken as applicable to the case, and by such principles of international law, not inconsistent therewith, as the arbitrators shall determine to be applicable to the case:

RULES.—(a) Adverse holding or prescription during a period of fifty years shall make a good title. The arbitrators may deem exclusive political control of a district, as well as actual settlement thereof, sufficient to constitute adverse holding, or to make title by prescription.

(b) The arbitrators may recognize and give effect to rights and claims resting on any other ground, whatever valid, according to international law, and on any principles of international law which the arbitrators may deem to be applicable to the case, and which are not in controvention of the foregoing rule.

(c) In determining the boundary line, if territory of one party be found by the tribunal to have been at the date of this treaty in the occupation of the subjects or citizens of the other party, such effect shall be given to such occupants as reason, justice, the principles of international law and the equities of the case shall, in the opinion of the tribunal, require.

ARTICLE V.—The arbitrators shall meet at Paris, within sixty days after the delivery of the printed arguments mentioned in ARTICLE VIII. and shall proceed impartially and carefully to examine and decide the questions that have been or shall be laid before them, as herein provided on the part of the Governments of her Britannic Majesty and the United States of Venezuela, respectively.

Provided, always, that the arbitrators may, if they shall think fit, hold their meetings or any of them at any other place which they may determine.

All questions considered by the tribunal, including the final decision, shall be determined by a majority of all the arbitrators.

Each of the high contracting parties shall name one person as its agent to attend the tribunal and to represent it generally in all matters connected with the tribunal.

ARTICLE VI.—The printed case of each of the two parties, accompanied by the documents, official correspondence and other evidence on which each relies, shall be delivered in duplicate to each of the arbitrators and to the agent of the other party as soon as may be after the appointment of members of tribunal, but within a period not exceeding eight months from the date of the exchange of the ratifications of this treaty.

ARTICLE VII.—Within four months after the delivery on both sides of the printed case either party may in like manner deliver in duplicate to each of the said arbitrators and to the agent of the other party a counter case and additional documents, correspondence and evidence in reply to the case, documents, correspondence and evidence so presented by the other party.

If in the case submitted to the arbitrators either party shall have specified or alluded to any report or document in its own exclusive possession, without annexing a copy, such party shall be bound, if the other party thinks proper to apply for it, to furnish that party with a copy thereof, and either party may call upon the other, through the arbitrators, to produce the originals or certified copies of any papers adduced as evidence, giving in each instance notice thereof within thirty days after delivery of the case; and the original or copies so requested shall be delivered as soon as may be and within a period not exceeding forty days after the receipt of the notice.

ARTICLE VIII.—It shall be the duty of the agent of each party, within three months after the expiration of the time limited for the delivery of the counter case on both sides, to deliver in duplicate to each of the said arbitrators and to the agent of the other party a printed argument showing the points and referring to the evidence upon which his Government relies, and either party may also support the same before the arbitrators by oral argument of counsel; and the arbitrators may, if they desire further elucidation with regard to any point, require a written or printed statement or argument, or oral argument by counsel, upon it; but in such case the other party shall be entitled to reply either orally or in writing, as the case may be.

ARTICLE IX.—The arbitrators may, for any cause deemed by them sufficient, enlarge either of the periods fixed by ARTICLES VI VII. and VIII. by the allowance of thirty days additional.

ARTICLE X.—The decision of the tribunal shall, if possible, be made within three months from the close of the argument on both sides.

It shall be made in writing and dated, and shall be signed by the arbitrators who may assent to it.

The decision shall be in duplicate, one copy whereof shall be delivered to the agent of Great Britain for his Government and the other copy shall be delivered to the agent of the United States of Venezuela for his Government.

ARTICLE XI.—The arbitrators shall keep an accurate record of their proceedings and may appoint and employ the necessary officers to assist them.

ARTICLE XII.—Each Government shall pay its own agent and provide for the proper remuneration of the counsel employed by it, and of the arbitrators appointed by it, or in its behalf, and for the expense of preparing and submitting its case to the tribunal. All other expenses connected with the arbitration shall be defrayed by the two Governments in equal moieties.

ARTICLE XIII.—The high contracting parties engaged to consider the result of the proceedings of the tribunal of arbitration as a full, perfect and final settlement of all the questions referred to the arbitrators.

ARTICLE XIV.—The present treaty shall be duly ratified by Her Britannic





## DR. J. C. AYER & CO.'S STANDARD FAMILY MEDICINES.

Approved by the Profession.

Full directions, in various languages, accompany each bottle of our medicines.

### Ayer's Cherry Pectoral,

For the rapid cure of Diseases of the Throat and Lungs.

### Ayer's Sarsaparilla,

For purifying the Blood and the cure of Scrofulous Diseases.

### Ayer's Ague Cure,

Warranted to cure all Malarial Disorders.

### Ayer's Hair Vigor,

For Restoring gray hair to its Original Vitality and Color.

### Ayer's Cathartic Pills,

The most valuable Home Remedy for all Purgative Purposes.

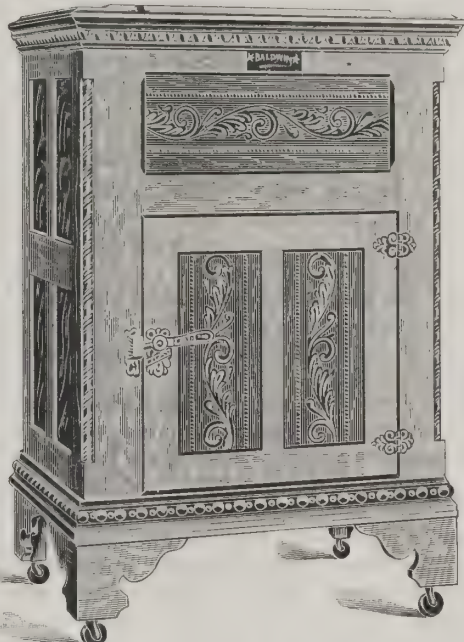
Prepared by Dr. J. C. AYER & Co., Lowell, Mass., U. S. A. Dealers liberally supplied with almanacs, show cards, and other advertising material.

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ALWAYS UP-TO-DATE.

110 Varieties,  
New Styles,  
Handsome Designs,  
Low Prices,  
Liberal Discounts,  
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THE BALDWIN REFRIGERATOR CO.,  
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THE WORLD-  
RENOVED

## "Perfection Water Elevator AND Purifying Pump."

A Sure Preventive against Malaria, Typhoid  
and Other Fevers.

THE EXACT PUMP FOR YOU.

This Pump is guaranteed to purify the foulest water  
in well or cistern in 10 days' ordinary usage.

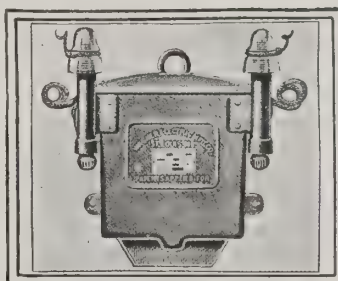
How does it purify?

Each bucket descends full of air and ascends full of water. For each gallon of water drawn a gallon of air or oxygen (the vital element) is circulated through the water from the bottom to the top. This not only thoroughly agitates, ventilates and purifies the water, but also forces a large supply of oxygen which is sufficient to consume all impurities or organic matter in the foulest water. It is an admitted fact by thousands using them that this Purifier is the only Pump that will destroy wigglers, water bugs and water lice, and make foul or stagnated water pure and sweet, removing all color, bad taste and smell. After a few days' usage of the "Perfection," the old flatness and insipidity in water is replaced by a sparkle like that of a mountain stream. In fact, it will make bad water good, and good water better. Write us for catalogue and book of information on impure water.

Our No. 6 Perfection (family use), all complete with chain, for 17 1-2 ft. well or cistern, \$17.00  
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For wells or cisterns of greater depth (family), chain per single foot, 30c.  
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We will allow you from the above list prices a discount of 60 per cent., delivered for export shipment F. O. B. N. Y. City. If you mention this paper we will allow an additional 5 per cent. Please give us plain shipping directions and state what N. Y. Broker we shall draw on for our money. Address us and write your broker.

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NOT the CHEAPEST to Buy

BUT the CHEAPEST to Operate

We have courted and ENCOURAGED

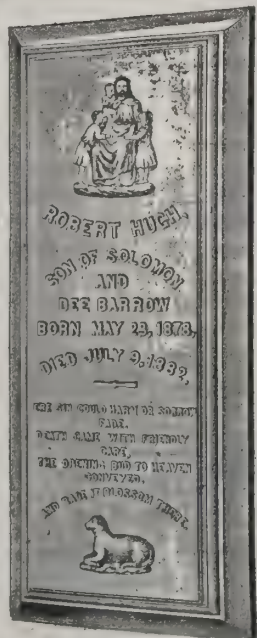
COMPARATIVE TESTS, knowing that our Competitors alone had cause to fear them

REMEMBER, EFFICIENCY AFFECTS YOUR COAL PILE

The Cheapest Transformer is sure to prove the most expensive in the end

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WHEN WRITING US MENTION "THE AMERICAN EXPORTER"



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Of the Celebrated White Bronze.

This is a metal which has proven by time and scientific test to be indestructible by action of the elements. It will stand sudden changes of heat and cold without cracking; it will stand dampness and not become mossgrown.

Experience with stone has demonstrated the reverse.

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will not crumble and decay. It is the best and cheapest article used for monumental purposes. We make over 500 styles of monuments, tombs, statues, etc., and will send you a catalogue with illustrations of the same, including prices and valuable testimonials, if you write for one. Mention THE AMERICAN EXPORTER.

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## New Jersey Copper Paint

LEADS THEM ALL,

So our testimonials say.

We guaranteed this Copper Paint to be the easiest to apply and, owing to its being so finely ground, it is the smoothest paint in the market.

Highest Medals from American Institute, New York City.

### NEW JERSEY RED COPPER,

For yachts. Brightest color made.

### NEW JERSEY SEAM PAINT,

A perfect substitute for pitch

## NEW JERSEY PAINT WORKS

HARRY LOUDERBOUGH, Proprietor,

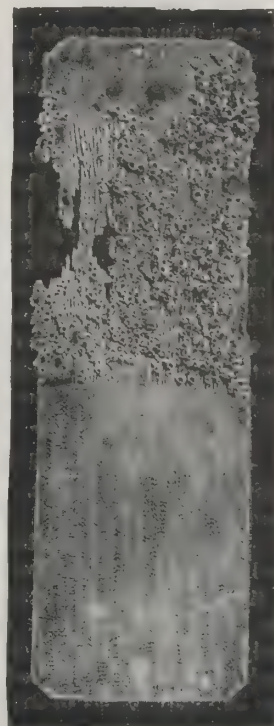
JERSEY CITY, N. J.

U. S. A.

### REMARKABLE FACT.

This cut is a copy of a photograph of a board having one end painted with New Jersey Copper Paint, manufactured by Harry Louderbough, proprietor of New Jersey Paint Works, Jersey City, N. J., U. S. A., and placed in the water at Port Royal, S. C., for five months. Upon the unpainted end you can note the ravages of the salt-water worm so destructive to wood, and also the large number of barnacles that have fastened upon it. Observe the painted end, where New Jersey Copper Paint was applied—its splendid condition.

The board here represented was placed in the water at Port Royal, S. C., by me, and left in the water five months. The painted end was as good as when it was placed in the water.  
MILLS EDWARD,  
Master Schooner "Florence Shya."





Majesty and by the President of the United States of Venezuela, by and with the approval of the Congress thereof, and the ratifications shall be exchanged in London or in Washington within six months from the date hereof.

In faith whereof, we, their respective plenipotentiaries, have signed this treaty and have hereunto affixed our seals.

Done in duplicate, at Washington, the 2d day of February, one thousand eight hundred and ninety-seven.

JULIAN PAUNCEFOTE [Seal].  
JOSÉ ANDRADE [Seal].

### An Open Market for American Goods.

THE Syracuse *Post*, referring to the visit of Mr. I. Darimont to that city, says: "Few European business men take a more active interest in American manufactures than I. Darimont, of Brussels, Belgium, who is at present a guest at the Yates. Mr. Darimont is an extensive importer, entering into his business with an enthusiasm which leads him to make a close study of every article he purchases with a view to more successfully introducing it into his country. He has a genial disposition, and granted a cordial reception to a *Post* reporter who asked him last evening for some information regarding the exports from this country to Belgium.

"Sixteen or seventeen years ago," he said, "we commenced the shipping of leather belting from the United States to Brussels, and to this we afterward added many other lines, including hardware, household articles and tools—especially agricultural tools. In this latter connection the American articles were superior to those of Europe, owing to their lightness, but we had to use a great deal of care in selecting our instruments. In building, for instance, the people of Belgium cannot use the same tools in vogue here, owing to the fact that the style of construction is so different. Then it is noticeable in our country that the workmen are conservative and do not readily learn the use of new tools. We would have succeeded better if the ironmongers had studied the use of the tools, as we did ourselves. In quality and adaptation I have found the American tools very superior to any others of the world, being better finished and light, and they have a style that distinguishes them from those of any other country.

"In tools and machinery we have found many articles of the very best make. As an example of this I may say that some builders of steam machinery in our country wanted a standard meter, and we supplied them. When they tried it they brought it back, stating that it was not correct. We accordingly took it to the Government inspector and had it tested, finding it was more correct than the Government standard. Four years ago we first introduced American bicycles into Europe. There had only been a few of them there before. The people, who had been accustomed to use heavy wheels, would not believe that the light American wheels were sufficiently strong. I undertook to prove that they were, and rode one through Europe, starting from Brussels, going to Copenhagen, Berlin, Leipsic, Breslau, Vienna, Venice, Milan and other towns, and back to Brussels. The wheel I used weighed 21 pounds, and, besides the baggage, I weighed 190 pounds. The trip extended over 4,000 miles, and I returned all right. When we had proved that the American bicycle was as good as could be bought in Europe, a demand for it was created, and now nearly every American wheel is represented there.

"We have noticed, as far as our experience has gone, that the packing of American goods is very well done. This is a great point in sending materials a long distance. Of course, the introduction of the goods is the hardest, and it sometimes takes not only months but years to create a demand. There are numerous articles now being sold in Belgium by the thousand where they were sold only by the dozen before we called the attention of the people to them. Now we have had such experience that we know what may be introduced successfully and what may not be. In building, for example, the windows and doors are not the same as here. If a manufacturer thinks of introducing American styles in this line into our country he must not stick too closely to old models, but must make numerous alterations."

EXPORT business with Colombia, a number of merchants claim, was quite satisfactory during the past month. In fact the exports to that country for January are believed by some to be the largest for a single month ever known. One day four steamships left this port, all of which touch at many of the ports of that republic, and all had satisfactory cargoes. On the 26th ultimo the steamer Glenmavis cleared for Savanilla with a miscellaneous cargo, consisting principally of provisions, machinery and hardware. She carried the largest cargo that ever left this port for Savanilla. According to official documents she took 16,191 packages, giving a total weight of 1,654,146 pounds. The shipments were divided among twenty-five export houses.

—An order was placed on January 22d by an export firm for four light locomotives for plantation use. They will go to the English West Indies early in March.

—It is reported that the Bethlehem Iron Works have closed a contract with the Russian Siberian Railroad for a large quantity of steel rails. At the office of the company in this city it was stated that no advices had been received. The representative of the company said, when questioned, that it was quite likely that the works had closed a contract, as he knew they were bidding for work on that particular road. Out of the nine large rail mills in this country four only cater direct to any extent to the export trade. The others seem to be satisfied with what they do in the export direction through dealers.

### Wizard Edison's New Discovery.

THOMAS A. EDISON is soon to startle the world with another wonderful discovery. Not content with giving to mortals the incandescent lamp, the graphophone, the kinetoscope and the fluoroscope, he now proposes to make the human body transparent. In a word, we shall one of these days literally "see through a man."

Heretofore a post mortem examination has been necessary in order to understand the mysterious make-up of some people. If Mr. Edison's expectations are realized, however, the same result can be reached by an ante-mortem diagnosis, and the secrets of the human "prison house" disclosed before the breath leaves the body.

To be brief, the wizard has just discovered a new chemical combination in his laboratory at Llewellyn Park that promises to revolutionize surgery, and even the broader domain of science. Indeed, to state the exact facts, Mr. Edison has succeeded in manufacturing a number of new crystals which offer great possibilities in connection with the fluoroscope.

Several of them in particular hold out the hope that physicians may sooner or later see the exact position and condition of the internal organs of their patients. Less than a year ago it was thought a remarkable thing to see the bones of the hand. To-day Mr. Edison's experiments have been so successful that he can discount the revelations of the best X-ray photograph made a couple of months ago.

And the probabilities are that the physician of the future, by the aid of the fluoroscope, will be able to tell at a glance whether or not a man is in good health and free from bone formations, cancers, tumors and the like. Moreover, with the new crystals already discovered, a man's eyes may be securely bandaged and yet he can discern objects in a room. So that in cases of blindness, where the visual organs are not entirely destroyed, there is a chance for the sightless to see dimly under certain circumstances. Such are some of the possibilities bound up in the new discovery.

Mr. Edison for the present refuses to disclose the names of the new chemicals. He very modestly remarks that he is still experimenting with them, and that he wants to exhaust their possibilities before announcing the results to the world. But he very kindly wrote out for me the following statement of what he had accomplished. It is an exceedingly modest account of his experiments, to say the least, and only hints at the expectations the "wizard" whispers in the ears of his assistants, and which he sooner or later hopes to realize. The part of Mr. Edison's statement that describes the new chemical discovered is as follows:

"Mr. Edison first purchased in this country and Europe all the different chemicals known or sold in the trade which he did not already possess. These were all tried in the fluoroscope, and only one was equal in sensitiveness to tungstate of calcium.

"Since then, however, Mr. Edison's chemists have been making chemical combinations not procurable elsewhere. Thirty new substances per day have been the average products. These have been subjected to the X-ray, and their fluorescing power measured.

"Mr. Edison has found one chemical which is more sensitive to the X-ray than any heretofore known. He will keep on in his work, however, until there is little hope of finding anything better, although he says that the chances of discovery can never be exhausted, the possible chemical combinations running up into the hundreds of millions. Should Mr. Edison succeed in finding what he is after there is no doubt that the fluoroscope will be an instrument of great value to the surgeon, for by means of it he will be enabled to make an accurate diagnosis of the internal organs of man."

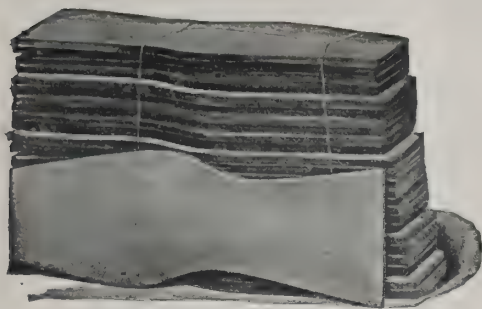
### Specially Designed for Drummers.

A NEW sample display has been invented by William F. Hammond, of Kansas City, Mo. The majority of sample cases at present in use, for the display of confections in particular, consist of a number of superimposed trays for the goods. To display the samples the grip must be first unstrapped and then the trays must be lifted out and spread upon a counter or other convenient resting place. The objectionable features of these grips are apparent. The agent must use up considerable time (both of his and the merchant's) in preparation for the display of his goods, and he must have considerable space whereon to place his trays so that the goods may show to the best advantage. The object of Mr. Hammond's invention is to overcome these objectionable features by providing a case of such construction that immediately it is opened all the samples it contains are under observation, so that practically only a moment's time is consumed in exposing the samples or in shutting them from sight by closing the case, and no valuable space is needed in the display, as the case may be opened as conveniently upon one's lap as upon a counter. This new device will be neatly appreciated by all travelling men and will be found of incomparable service in many connections. It combines economy of space with simplicity, strength, durability and inexpensiveness of construction.

—A shipment of five carloads of machinery for South Africa left New York early this month. The principal items were rock-crushing and ore-breaking machinery, hoists and drills.

—The exports of furniture to certain countries have increased, according to a leading manufacturer, in a satisfactory degree. In 1895 this concern, which makes only bed and drawing-room furniture, sold for export to Mexico and Central and South America little more than \$42,000. During 1896 it claims that its business increased over 35 per cent.





American shoemakers and shoe-menders have got ahead of you. They don't buy whole sides or sole-leather now.

A shoemaker wants 2 or 3 grades and 4 or 5 thicknesses.

We cut sides, make 8 grades and 15 thicknesses, sell the cobbler the grades he wants, and the rest, including the waste, to somebody else, who wants that.

All well served; no waste; no using leather because you've got it.

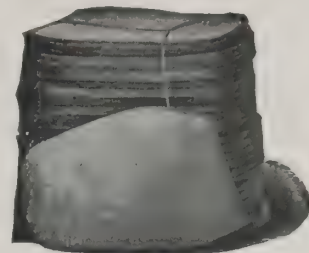
We do this business better than anybody else—it is a close wholesale business.

Do you want to know about it?

BAXTER SCHENKELBERGER & CO.,

350 Congress street, Boston, U. S. A.

50 Tabernacle street, London.



## Do You Smoke a Pipe?



Our **DIAMOND** Steel Combination Pipe Cleaner and Cigar Cutter will make your old pipe **Sweet and Clean in One Minute**. It will also clip the end off your cigar in one second and make you happy. Beautifully pickled. Price, 15 cents. Will sell everywhere. Ask for the agency quick.

## 1,000,000 Diamond Safety Razors at 25 Cents each.

One for every man who shaves himself. Just to introduce our Diamond Steel Hand-Forged Cutlery, Knife Sharpeners, Skate Sharpeners, Scissors Sharpeners and Household Specialties into every home on earth.

**THE DIAMOND KNIFE SHARPENER** sharpens any carving knife, kitchen knife or bread knife in 10 seconds. It is the only article made that will sharpen the famous Christy bread knife. The Diamond Scissors Sharpener is wanted by all Barbers, Tailors, Dressmakers and every woman on the four continents. With the Diamond Skate Sharpener every skater sharpens his own skates. **THE DIAMOND SHARPENERS ARE THE ONLY SHARPENERS.** They all do the work quickly and well. **THIS WE WARRANT.** The price is 25 cents each the wide world over. Send your orders through any commission house.

**DIAMOND CUTLERY CO.,**

60 Broadway, NEW YORK CITY, U. S. A.



## '96 JENKINS '96 is the Perfection of Joint Packing.

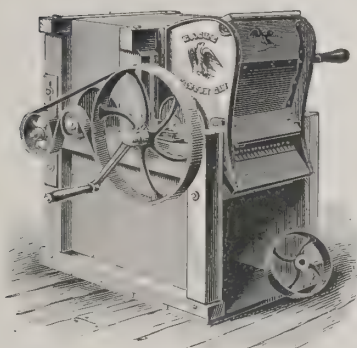
INSTANTANEOUS, DOES NOT SQUEEZE OUT

and not necessary to follow up joint. We guarantee it to last for years on any and all pressures of steam, or any kind of joint where packing is required. **DOES NOT ROT, BURN, OR BLOW OUT, therefore the BEST FOR ALL PURPOSES.**

Call for and insist on having '96 Jenkins '96 stamped like cut.

**JENKINS BROS., 71 John St., New York, U. S. A**

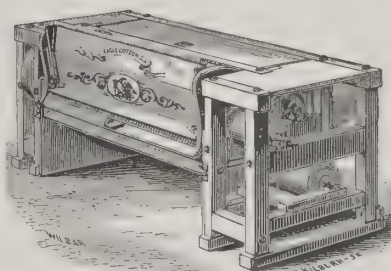
## EAGLE COTTON GINS.



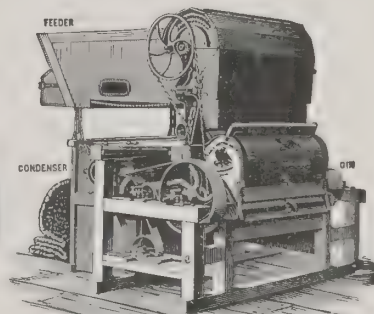
These Gins enjoy a **BETTER REPUTATION** THAN ANY OTHERS OF THEIR CLASS IN EXISTENCE, and are **PREFERRED** to all others made, on account of their **STRENGTH, SIMPLICITY, DURABILITY**, the amount and **EXCELLENCE** of the work they accomplish, and the **RAPIDITY** of their operation.

For further details, illustrated Catalogues will be furnished on application.

**Eagle Cotton Gin Co.** { FORMERLY Bates, Hyde & Co. } **Bridgewater, Mass.**



Power Gin with 12-inch Saws.



Power Gin with 10-inch Saws, with Feeder and Condenser.



## SAFETY KETTLE BOTTOM.

Prevents Meats and Vegetables from burning while cooking. Can be used for various purposes, either as Steamer, Broiler, Toaster, etc.

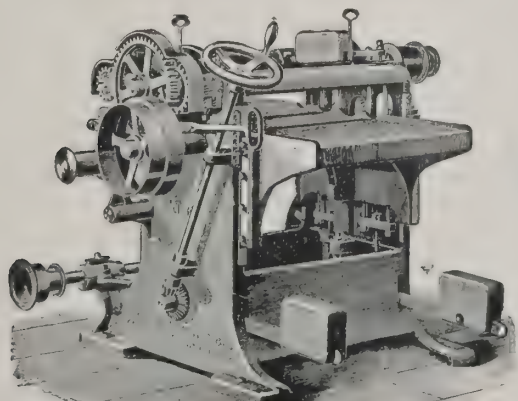
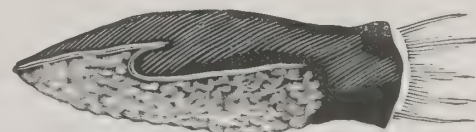
## Stove Polishing Mitten,

FOR BLACKING AND POLISHING A STOVE.

It is one of the most valuable articles ever introduced in the household. Keeps the hands clean. Every woman will appreciate it after one trial. Easily fits the hand, has a waterproof back, and the whole front is made of the most durable and soft sheepskin, tanned with the wool on, superior to all others. **With each mitten we give a dauber.** By using the Stove Polishing Mitten, blacking a stove ceases to be dirty and disagreeable, which every lady dreads; for in the old way she knows it will take twenty-four hours to get the blacking out of her finger nails. But our mitten does away with all that, for she can make her stove shine like a mirror, and in one minute go to the parlor, entertain company, make bread, or sit down and sew on the finest white goods, **without a speck of blacking on her hands.**

\$18.00 per gross F. O. B. at New York.

For Particulars address **DIAMOND HARDWARE CO., 620 Atlantic Ave., Boston, Mass., U. S. A.**



No. 93. Panel Planer, 24 inches wide, 6 inches thick. Weight, 2,000 lbs.

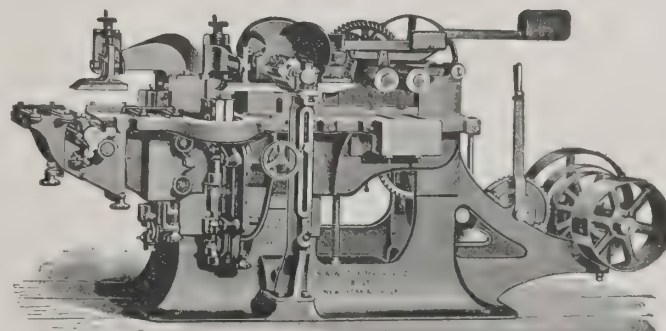
Send for Catalogue "F" at once, illustrating and describing

**HIGH-GRADE Wood-Working Machinery.**

**S. A. WOODS MACHINE CO.**

BOSTON, MASS. U. S. A.

Correspondence solicited.



No. 130. Outside Moulding Machine. Works 4 sides, 7, 8 or 9 inches wide. Weight, 3,000 lbs.



# VICTOR Disc Harrow.

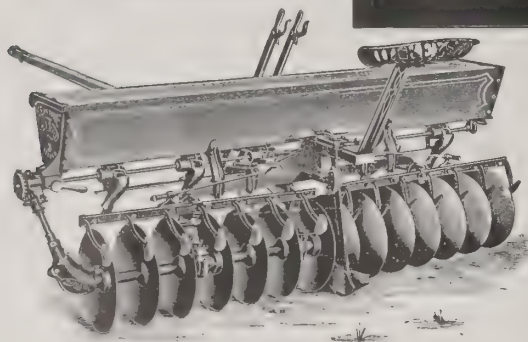
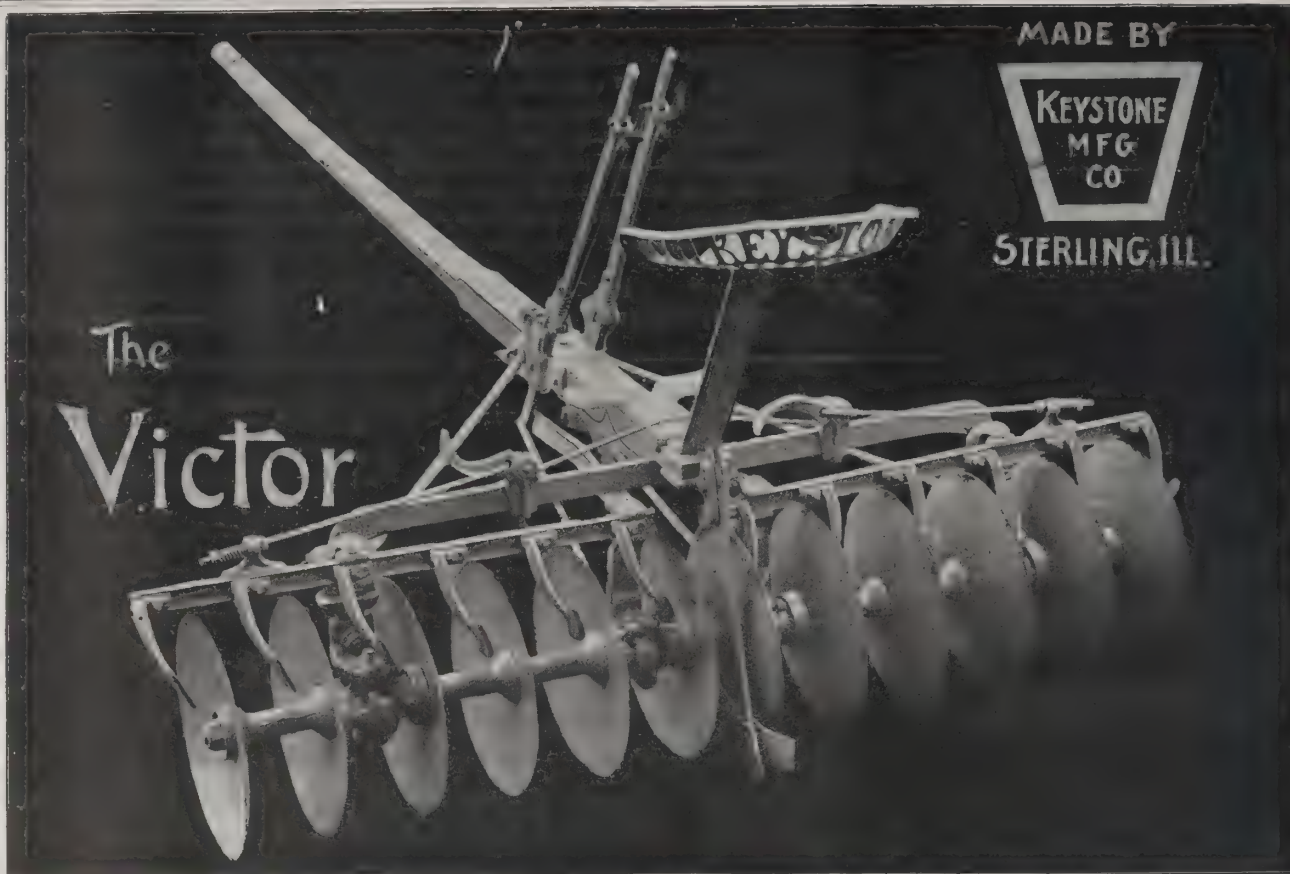
An unsurpassed soil pulverizer for all crops and for all countries. In sizes from 4 feet to 8 feet wide.

All Steel and Iron.

Neat and Strong  
Ball Bearings.

Double Lever.  
Effective Scrapers.

The Best Middle Cut.



THE  
VICTOR  
with  
Seeder  
Attachment

The Seeder Attachment is force-feed with the simplest seed cup. Sows all kinds of grains. The whole work of sowing, pulverizing, covering seed, turning under manure or fertilizer is done at one operation. Saves much time and work.

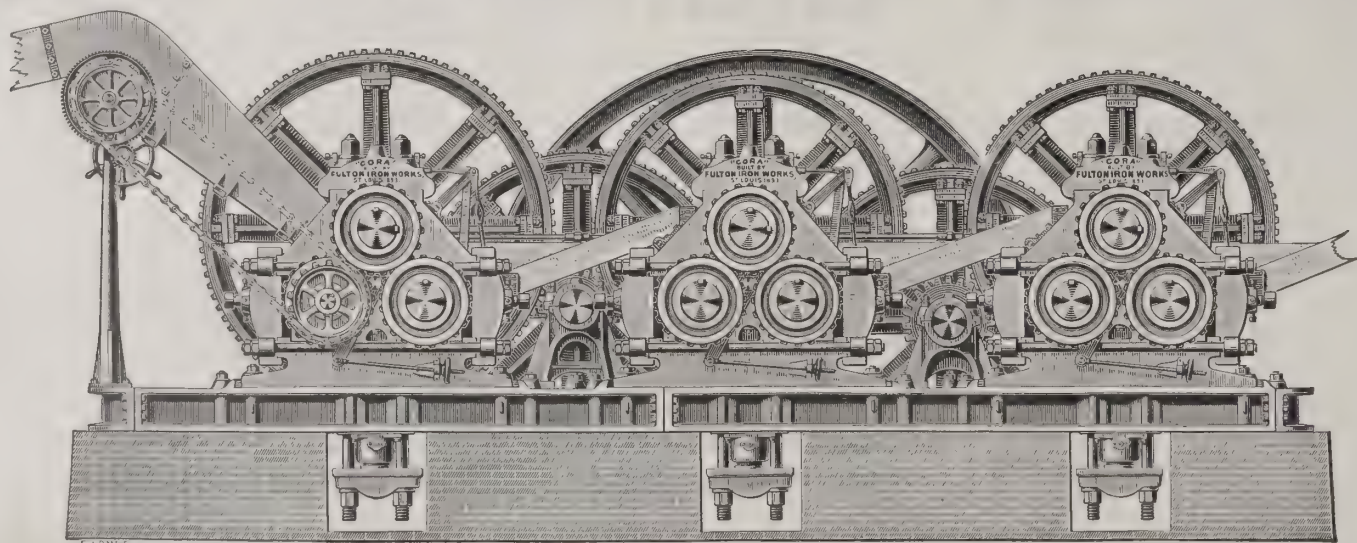
SEND FOR FULL DESCRIPTION TO \_\_\_\_\_

**KEYSTONE MFG. CO.,** STERLING, ILL., U. S. A.

Export Office: B. 21 Produce Exchange, New York.

# “CORA” Nine-Roller Cane Mill.

CORRESPONDENCE SOLICITED.



ESTIMATES FURNISHED.

Built by **“FULTON IRON WORKS,”** St. Louis, Mo., U. S. A.

Per S.S. “COPTIC”

FULTON IRON WORKS, St. Louis, Mo.

HONOLULU, H. I., June 17th, 1895.

Dear Sirs: The nine-roller mill and Corliss engine built and erected for us by you last year has given perfect satisfaction, and we take pleasure in furnishing you with the following report covering work performed by it during the season just closed. Days grinding, 104 $\frac{3}{4}$ ; Tons of cane ground, 61,617.928; Tons of cane ground per day, 588.238. Extraction: 92.49 per cent. total sugar; 82.13 per cent. of cane; Dilution, 7.91 per cent.; Fibre in cane, 11.02 per cent. Average load on hydraulics, 313.2, 334, 344.5 tons.

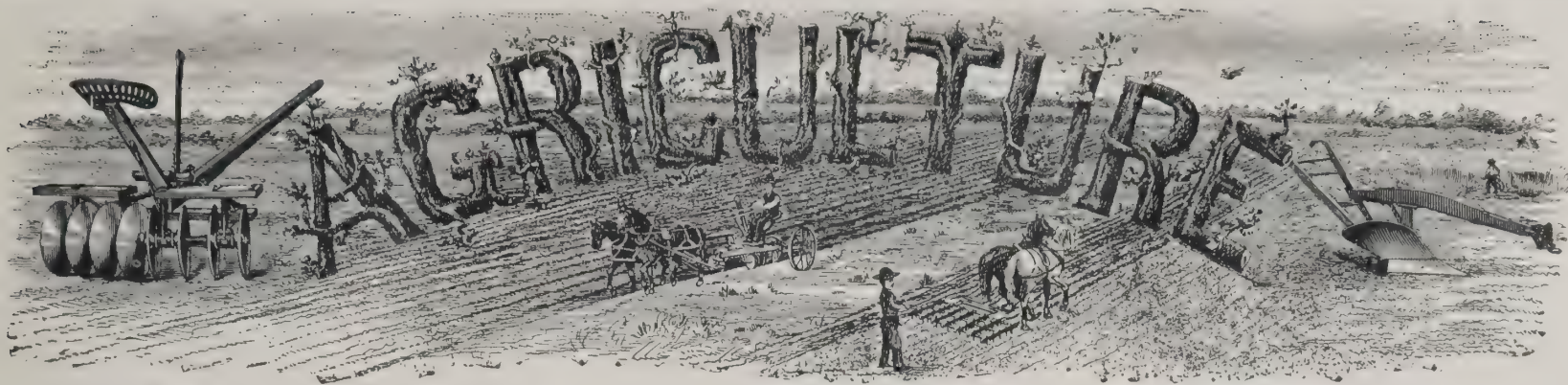
It is hard to say just what is the capacity of this mill, as our boiling house is not of sufficient size to admit of a prolonged test, but we would say that we have ground on a short run over 50 tons of cane per hour, and with an increase of from 50 to 75 tons in the load on the hydraulic obtained an equally good extraction. We believe we have the best mill on the Islands.

Very truly yours,

EWA PLANTATION CO.,

E. D. TENNEY, Secretary.





DEVOTED TO THE FOREIGN TRADE IN AGRICULTURAL MACHINERY AND IMPLEMENTS

### Something About Bees.

THE queen honey bee is the mother of the swarm or colony, writes G. W. Demaree in the *Rural World*. The number of bees in a colony varies according to the time of year. In the height of the breeding season, say in the month of June, a large colony of bees may contain fifty and even sixty thousand workers, the progeny of one mother bee, called the queen. In the swarming season a strong queen in her prime will lay from two to three thousand eggs in twenty-four hours. As incredible as it may look to the uninitiated, a very prolific queen can lay her own weight in eggs in a day. The sex in bee economy is the same as in other animals; there is no such thing as a "neuter" among bees. The queen lays best two kinds of eggs, male and female. The worker bees are undeveloped females and the drones are the males; the queen is a highly-developed female. She is reared in a cell one-third of an inch in diameter and is highly fed on "royal jelly" while in the larval state; on the sixteenth day from the laying of the egg she emerges from her cell a queen indeed. When five to seven days old she takes her first flight into the open air in search of a mate. On the first day of her bridal trip she may take two flights and be absent two to five minutes each time. On the following day, if the observer will take his position in front of the hive at 1 o'clock P. M., it will not be long before he sees a slight commotion at the front of the hive, the worker bees running excitedly about the entrance. This warns him that her royal highness is making ready for her wedding tour. On the previous day her flights were in circles, her head all the while turned toward her domicile, but now she appears finely inflated and bravely dashes into space. The observer keeps his eyes on her till she passes out of sight; with watch in hand he counts the minutes. If ten or twelve minutes expire and she delays her coming it may prove her last trip, though she may return once or twice in less time. On her final trip she will be absent from eighteen to twenty-two minutes, and when she returns, to the evident joy of the bees who watch for her coming, she brings with her the visible evidence of having "mated." From that day she never leaves the hive except to go out with a swarm, though she may live and deposit eggs two, three or four years. I owned one queen of the Italian race, a daughter of a queen imported from Italy, that lived four years and two months. I clipped one of her pairs of wings, so that I could identify her. I now clip all my queens; this is done to prevent the swarms deserting at swarming time. The worker bee is produced from the egg in twenty-one days; it requires three days for the egg to hatch into a minute larva (worm). The larva state lasts about seven days, when the cell is sealed over by the nurse bees; then follows the chrysalis or nymph state—the greatest of all mysteries in insect life—and this is followed by the perfect imago, the worker bee. The drone is produced in his season in twenty-three days from the laying of the egg. Queen bees live on the average about two and a half years; worker bees in the working season live about sixty days, but in a state of rest, as when in winter quarters, the workers may survive six months and in some cases longer. It is more difficult to ascertain the natural life of the drones or male bees, as the workers will not tolerate them after the swarming season is past, but I have kept them in queenless colonies and found that they will live two or three months. It could never be known to a certainty how long bees live under natural conditions until bees differing in color from our common black or brown bees were imported to this country and the art of introducing one queen in the place of another was discovered. If we capture and remove the queen from a colony of black bees and introduce a queen of one of the yellow varieties—Italian, Cyprian or Syrian—in her place it will be found that the colony will be changed to a colony of yellow bees in about two months from the time the last of the progeny of the black queen hatches out. Nearly all the black bees will die in that interval of time.

### The Sheep Tick.

EVERY one who has sheep knows the tick, the worst pest of this animal, that does serious harm to the young lambs without suspicion of the cause to the shepherd. This reddish-brown creature is a wingless fly and a very greedy bloodsucker. A dozen of them on a lamb will quickly suck the little one dry. It is to be looked after at the time of shearing, when these insects go for shelter to the lambs. It is found mostly where the animal cannot reach it—on the brisket or the shoulder, where it stays with its head buried in the skin, sucking the blood. Its skin is tough, and it is not easily crushed with less than a blow of a hammer. In small flocks it is not much of a job to go through and, with a pair of small scissors, cut the ticks in two, but where the flock is over a score it will be necessary to dip the lambs.—*Ex.*

### Pure Water on the Farm.

HARDLY second in importance to plenty of good feed is an abundant supply of pure water on the farm where dairying is a leading business, says an exchange. Be the rations ever so plentiful and the supply of water scanty or filthy, the cows cannot do what is expected of them. Cows giving milk need a large amount of water, as any farmer will notice when undertaking to furnish a supply, when from any cause there is a scarcity. It is needed in the pasture in warm weather and at the barn or feed lot in Winter. It is bad to be short in supply in Summer, but much worse in cold weather, when it is usually so much more difficult repairing water mains and tanks or obtaining a fresh supply. It will pay the farmer to make some extra outlay in order to obtain an abundance of never-failing water, good for all parts of the year. In wet seasons ponds and creeks furnish all that is needed for cattle, but in dry times windmills must be put in operation to meet all the requirements, as much loss comes to the dairyman and stock raiser when the water reserve falls short. By all means have a plentiful supply of water for Winter. The nearer to the barn this can be located the better it will be, especially in blustering weather. Whether it shall be in the stables will best be determined by the owner. Since the tuberculosis scare it is thought best by many to be safer and better to have it outside the stables, but if out of doors it should be well protected from storms. Dairy cows in particular should have as comfortable a place in which to drink in bad weather as is possible to furnish. It may sometimes be necessary to drive quite a little distance for water, but if the drinking place is well protected and provided with plenty of good water, not too cold, there will be little trouble or loss, but to be obliged to go a long way and then drink from an icy creek in a bleak place, any one can see would be injurious for milch cows and must materially diminish their profitableness, and the same rule would apply in a lesser degree to fattening animals. Half-watered and half-fed stock give no returns, besides being inhuman.—*Ex.*

### Ham and Bacon.

WHILE looking upon many things American with the eye of insular prejudice, the British heart warms when our bacon and ham are mentioned. Porcine products from Belgium and Holland no longer corner the appetite of our English cousins. Their taste has been educated to just appreciation of the Yankee breakfast bacon, formerly regarded as too rich, while the ham of free Columbia at length has displaced its rival from Westphalia. Last year our ham exports aggregated 131,000,000 pounds, valued at \$12,000,000, of which Great Britain took 103,000,000 pounds. We also shipped 450,000,000 pounds of bacon, valued at \$19,000,000, and 75 per cent. of it went to the United Kingdom. The same country absorbs the greater part of our oyster export, which annually amounts to \$600,000 in value. England ate nearly all of the 225,000,000 pounds of fresh beef which we sent abroad last year. These things may be taken as strong arguments in favor of arbitration.

### Value of Shade.

NATURE protects the soil from the burning rays of the sun by an imperious shade. Nature, by shade, by roots, by dead branches, by rocks and by leaves, throws obstruction in the way of evaporation and washings. Man, by removing the shade and verdure, promotes evaporation and wash, and by continued plowing, and especially shallow plowing, puts it in the best possible condition for washing off the soil. Nature, through the millions of deep searching roots and earthworms of various kinds, provides for a free circulation of the air to great depths and thoroughly intermixes, pulverizes and mellows both the soil and the subsoil.

—H. Gibson & Co.'s oil mill, Calvert, Tex., has shipped within the past month fifteen cars (280 tons), of cotton seed meal to Hamburg, Germany, via Galveston. They have shipped this season to Germany over 2,000 tons of cotton seed meal. They have also shipped three cars of refined oil to Kansas City and one to Chicago to-day.

—American competition in condensed milk has overcome all Europe, according to United States Consul Germain at Zurich, overrunning the German market and reducing the exports by more than one-half. The Consul says the German Government is only prevented from immediately imposing a heavy protective duty by a treaty provision which will expire in 1903.



### Cotton Mills in Japan.

MR. ALFRED B. SHEPPERSON in his "Cotton Facts" has an article on cotton mills in China and Japan. The cotton industry of Japan is attracting attention. Its progress has been rapid. Until recently the Japanese depended upon Europe and India for their cotton goods and yarns, but before many years they will manufacture all their own cloth and yarn and become competitors with England and India for the trade of China and other Eastern countries.

Mr. Shepperson says the Japs possess no special advantages for cotton manufacturing, except a good climate and cheap and efficient labor. The mills are equipped with the most modern European machinery, the duty on which is only 5 per cent. The wages paid operatives are very low, averaging only 17 cents per day for men and boys, and 9 cents for women and girls. The mills have two sets of hands and run night and day. With a good climate, cheap and efficient labor, and the most improved cotton machinery, we do not see any practical obstacle in the way of Japan controlling the cotton-goods trade of the Orient. It is only a question of time.

Mr. Shepperson's own figures show the wonderful progress made by the Japanese in cotton manufacturing. In June, 1888, there were in Japan only 10 cotton mills, with 83,360 spindles. In May, 1896, there were 63 mills, with 693,000 spindles, employing 43,000 operatives day and night. Four new mills, with 85,000 spindles, were projected, and it was proposed to add 368,000 spindles to the 63 mills. Mr. Shepperson says: "Within a few months, therefore, there will probably be 1,000,000 spindles at work on cotton goods and yarns in Japan. If the cotton industry of Japan has grown in eight years from 10 mills, with 83,360 spindles, to 63 mills, with 694,000 spindles, what will be the increase in ten years and in twenty years?"

### Japan's Purchases in America.

THE *Boston Journal of Commerce* says: "Our iron manufacturers and locomotive builders are gradually and surely getting a firm foothold in foreign countries for their products, and this, too, in close competition with foreign manufacturers. Producers of steel rails in this country are now in a position, as far as cheapness in manufacture and quality of product are concerned, to meet the very lowest prices, and we can confidently expect in the future to see a constant growth of their foreign trade. American locomotives have earned for themselves a high reputation throughout the world wherever they have gained a foothold, and for this reason it is not at all to be wondered at that the cute Japanese have been placing large orders with our builders. We chronicled in these columns a few weeks ago that the Japanese Government had placed orders for locomotives with the Rogers Locomotive Company, of New Jersey, for eighteen machines, both for passenger and freight service. They are to be about 50 tons weight and 3 feet 6-inch gauge, the standard gauge of the Empire. It is now reported that the Nippon Railway Company, of Japan, a private concern, has ordered forty locomotives of the Baldwin Locomotive Works of Philadelphia.

"The present mileage of railroads in Japan is not very large, having been but 2,283.35 miles, but there is in process of construction about 2,158.13 miles more. Concessions have been obtained for the building of 1,173.38 miles more. With the present impulse of the Japanese, it is not to be presumed they will rest content until their country is covered with a network of railways in every direction where railroads can be built and operated. Being Japan's natural market for the purchase of machinery, our trade in the future should swell to large proportions, and every encouragement should be made to secure our share. In addition to orders for railway supplies, several contracts have been placed in this country within a comparatively recent date for papermaking machinery. It is reported that three large plants have been ordered here, the aggregate value of which is estimated at from \$250,000 to \$300,000, and it is also stated that there has been a good demand for mining and electrical machinery."

### Agricultural Notes.

—The Iowa Farming Tool Company, Fort Madison, Iowa, are looking for an unusually large trade during the coming Spring, contracts and specified orders for steel goods and wood goods being numerous. This, they state, is not only the case with domestic trade, but also with foreign business, frequent orders being received from Australia, Sandwich Islands, South Africa, Great Britain and the Continent.

—It is not difficult to get rid of the patchy appearance of the butter by working it if it is cautiously done. No amount of direct pressure will injure the texture of the butter. It is the drawing of the ladle over the butter, so as to spoil the granular texture, by which the injury is done. The more butter is pressed by the ladle or the roller of the butter worker the finer will be the grain, the drier the butter will be, and the more even the color.

—An agricultural implement manufacturer, who caters principally for export business, says: "In closing our books for 1896 we find that twice as much business was done in the first six months of the year than since. For instance, our shipments to Australia, which is our principal market, in the first six months of the year amounted to \$58,000, while in the balance of the year they did not reach \$12,000. European exports were satisfactory throughout 1896. Of the South American countries the Argentine was our best customer, to which we sent during the year over \$22,000 of agricultural implements."

### Various Notes of Interest.

—Mr. Fred Vogel, the brewer, of Pueblo, has in view the erection of an ice plant in the city of Mexico.

—A South William street export firm will ship 3,000 pairs of shoes to the Argentine and 2,500 pairs to Central America within a month.

—R. B. Jones, a leading merchant of Guayaquil, Ecuador, who has been purchasing manufactured goods in this market through the export firm of Parraga Bros., will shortly sail for Guayaquil.

—Shipments of dynamite to South Africa have lately been favorable. Last month several good-sized lots went forward. Thus far this month the Repauno Chemical Company have shipped three carloads, worth \$11,500, to South Africa.

—Specifications as to gas works to be built in San Paulo, Brazil, have been received by the Brazilian Consul in New York City. Bids for their construction and supplying the gas are invited from English, French and American manufacturers, and must reach San Paulo by April 10th.

—An Australian exporter claims to have recently sent to Melbourne the largest invoice of enamelware that has been shipped to that market in years. It amounted in value to more than \$8,000. It includes a quantity of kitchen utensils, toilet articles and many sanitary appliances.

—A London furniture journal says: "We have at last learned to like the conveniences of the roller top desk of America, despite its dissimilarity to our more genteel and less convenient writing tables, and now we are destined to regain at similar hands our erstwhile fondness for the rocking chair."

—The Great Western Pottery Company, of Kokomo, Ind., has sold a large consignment of sanitary earthenware to John Anderson, of Edinburgh, Scotland, the goods to be shipped at once. The pottery company has made arrangements to establish a general agency in Scotland for the sale of American ware in England, Scotland and Ireland.

—Twenty-four carloads of armor plate for Russia's new battleship Rostoslav have left the ordnance works of the Bethlehem Iron Company, Bethlehem, Pa. The plate is consigned to the Russian Government at Sebastopol, and is shipped by way of New York. The shipment weighed 528 tons and is the largest of its kind ever made from America to a foreign port.

—An order for 2,000 felt hats was received recently for prompt shipment to Buenos Ayres. Heretofore the shipments of hats from here to the Argentine Republic have been comparatively small. The above order is one of three which have been received within four months for that market. England and Germany are our greatest competitors in this direction throughout Central and South America.

—Norfolk, Va., which has long been known as the great centre for the sale of cleaned peanuts to American dealers, is now well up in importance as an exporting point. Thousands of sacks of the nuts are being sent abroad, and the market has assumed a healthier tone. The output of all the factories will, it is said, be increased during the present year. Most of the cleaning mills are running on full time and employing large numbers of hands.

—Capitalists are beginning to recognize the fact that there is big money to be had in competing with foreign nations for the ocean carrying trade. An enterprising American who three years ago furnished the money for building and equipping a schooner for the South American trade has realized on an average of 30 per cent. on the investment out of the profits of his venture. This would indicate that the ocean carrying trade is profitable, and capitalists can hardly find a better investment for their surplus money than this.

—Speaking of the rumor that American paper mills on a large scale are to be established near London, an English paper, *Industries and Iron*, remarks that there is no reason why such an enterprise should not succeed. "English paper-makers," it says, "have for years striven in vain to manufacture a paper possessing the qualities of an American printing paper, and which are so highly prized by the printer and bookbinder, while it is notorious that during the past few years a very large and increasing trade has been developed in the export of American newspaper to this country."

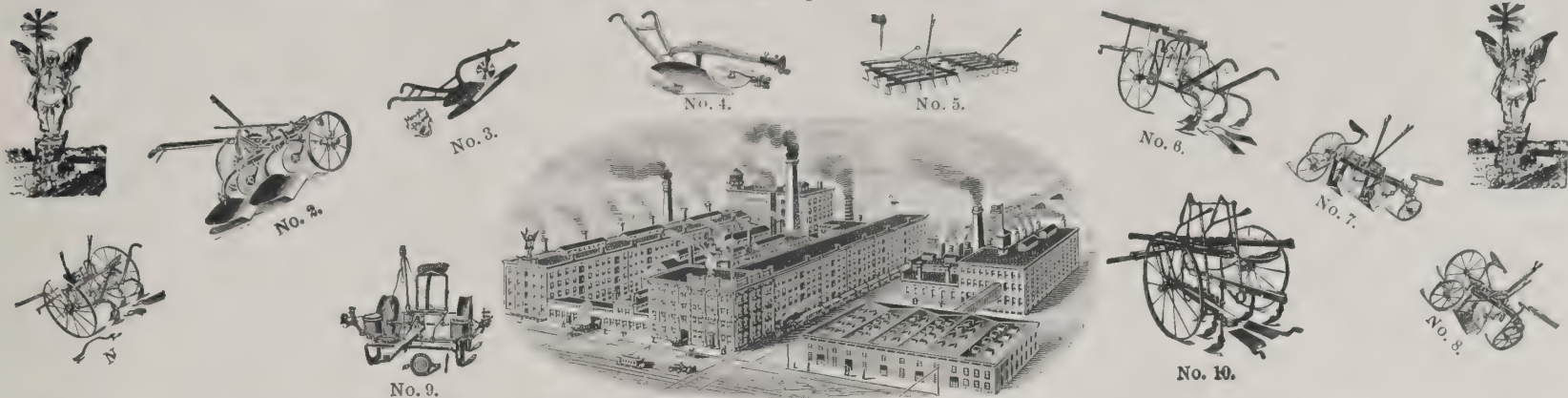
—Perhaps the largest transaction ever closed in the St. Louis market for outfitting supplies for a new enterprise was that concluded recently between Mr. W. Clyde Henry, purchasing agent of the Orinoco Company, Limited, of Santa Catalina, Venezuela, and the A. F. Shapleigh Hardware Company, of St. Louis, under the terms of which the latter have furnished and shipped twenty-two carloads of machinery, mill supplies, hardware, wagons, etc., to New York, whence they will be taken by the Orinoco Company's own steamer to Venezuela.

—The Calcasieu Export Lumber Company, Lake Charles, La., has been chartered, and is the largest and most powerful lumber combine in the Gulf States, representing an annual output of over 100,000,000 feet of the sawed product, and a capital stock of more than \$1,250,000. The object is to get an outlet in European markets for Southwestern lumber, and thus procure better prices. Negotiations are now on with several large lumber buyers in the United Kingdom, and it is thought something like 16,000,000 feet will be exported by next June. Sabine Pass will be used as the ocean outlet until deep water is secured at Calcasieu Pass, and the ocean-going vessels will be loaded at the Texas port.



MOLINE, ILL.  
U. S. A.**MOLINE PLOW COMPANY,**MOLINE, ILL.  
U. S. A.

MANUFACTURERS OF THE BEST GRADES OF

**Sulky, Gang, Wheel Walking and Walking Plows, Harrows, Disc Harrows, Planters, Seeders, Drills, Cultivators, Hay Rakes, Beet Machines. Etc.**No. 1. Dandy Combined Riding and Walking Cultivator.  
No. 2. Wheel Walking Gang Plow, 24 inches.No. 3. Steel Beam Plow with Rolling Coulter S. B.  
No. 4. Wood Beam Plow with Rolling Coulter.

F. O. B. NEW YORK.

No. 5. Steel Lever Harrow.  
No. 6. New Western Cultivator.  
No. 7. Flying Dutchman Gang Plow.No. 8. Flying Dutchman, Jr., Sulky Plow  
No. 9. Moline Champion Corn Planter.  
No. 10. Germania Riding Cultivator.

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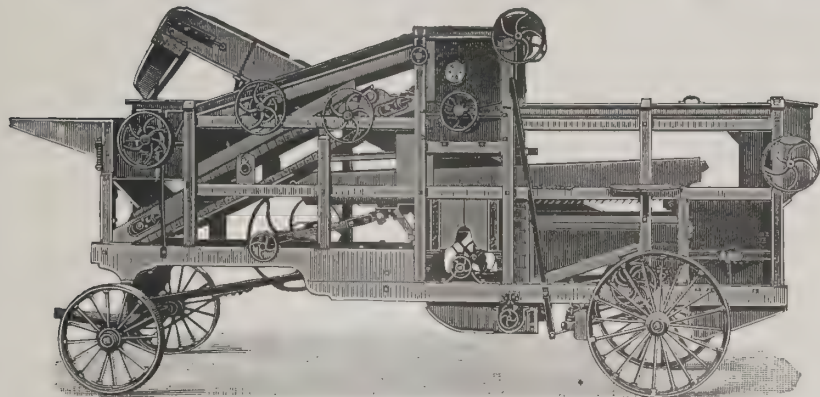
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# ELECTRICAL NEWS.

## Electrical Progress.

"YOU hear of wonders that electricity is about to perform, and of the wonders that it has been doing in the last few years, but you hear little of its new achievements in the past year," said a well-known electrical expert; "yet a great deal that is of interest, especially to women has been developed, and important improvements are expected this year.

"Probably more persons are striving to improve the storage battery than anything else, and a fortune beside which that of the Rockefellers would be small awaits the man who will solve this problem satisfactorily. But practical electricians are beginning to shake their heads and to view statements that the perfect storage battery is at hand with some distrust. Why? Because they are beginning to see that the storage of electricity, though possible and even practical, is too expensive to be profitable.

"It is possible to store steam; but to do this you must constantly burn up so much coal to keep the steam hot and up to the required pressure that it would not pay. Now, the waste in storing electricity is not exactly analogous, though sufficiently so for purpose of illustration, since it amounts to the continued consumption of valuable material without increase of power, and it seems to many practical electricians that the causes are basic and not to be overcome. This is the expressed opinion of both Mr. Edison and Mr. Tesla, and if a revolution should be brought about by a successful storage battery it seems probable that the invention will come from some altogether unsuspected source.

"As it is now, the storage battery is too heavy and too big to be successfully used. If applied to street railways, for instance, the battery must be freshly charged for each trip before the car is started out. Once started the trip will be completed, provided all goes well, otherwise the car is likely to be stranded on the road. The same trouble comes in to prevent the use of the storage battery on automobile or horseless carriages, and though these are slowly coming in, the practical makes are operated by naphtha and other petroleum products. It is true that word has been sent across the sea that the London Electric Omnibus Company has begun business by the use of storage batteries, but practical men on this side of the water are taking the story with several grains of salt for the present.

"Electrical inventors of the commercial sort—that is, those who are continually on the watch for something that can be made cheaply and command a ready and steady sale because its use will add to the comfort and convenience of the people—are now turning their attention to the household.

"One contrivance that is being used in the homes of many well-to-do women, and at least two of the big New York hotels, is an electric curling iron. It is also to be adopted, I understand, by some of the steamship companies. Being men, you and I do not appreciate the value of this contrivance, but it is, in fact, almost a priceless boon to women.

"There is a story that the genius who contrived this thing was stimulated to do so on learning that the use of alcohol and other lamps on board ships to heat curling irons had been forbidden for fear of fire, and that fair passengers had broken the rule in order to have frizzed and curled hair at sea. These electric curling irons can be carried about.

"Each consists of a small heating apparatus, to which is attached a flexible, insulated wire and a 'plug' that may be connected with the incandescent light wire on unscrewing the bulb. The two New York hotels that have put them in have mounted the heaters on marble bases and the irons are laid on the heaters in such a way as to allow the current to pass through them and become hot enough for use in an exceedingly short time.

"It is in cooking apparatus, however, that the electrical inventor is making best strides. Till lately the apparatus has been operated by a waste of current that has made it too expensive and by some other defects that have sometimes rendered it unpleasant. These drawbacks are now being remedied. Among the new things are electric chafing dishes, stewpans and broilers, all portable, and made so that they may be operated simply by substituting the plug of the apparatus for the plug in the socket of an incandescent lamp. The broiler is an especially good thing. It consists of a heater through which the wires run and a top of enamelled iron. When the broiling is to be done the top is placed on the heater so as to deflect the current from the base, and the white enamelled iron speedily becomes hot enough to cook the meat, the wires themselves at no time coming in contact with the meat.

"Improved electric cooking stoves that will do all sorts of cooking are on the market. Such stoves are used in many hotels and restaurants now and in many New York homes. They are so contrived as to be as cheaply operated as gas or oil stoves, and they are vastly cleaner. It is likely that the greatest expansion of the use of electricity in 1897 will be in the way of cookers.

"A footrest that is also an electrical footwarmer has also been recently devised, and seems likely to be popular. It will be an especially desirable thing for bookkeepers, clerks and business men who are obliged to sit or stand long hours at the desk in winter. Even in well-heated offices and stores, where outer doors are being opened every few minutes, workers often suffer from cold. Like all the other contrivances I have spoken of the electric footwarmer may be put into use by the substitution of its plug for that of an incandescent lamp. The top is large enough to accommodate a good sized pair of feet, and all danger of burning the shoes is obviated by an arrangement which prevents the temperature of the heater from rising above 145° F.

"A bicycle lamp to be used with a small storage battery has also been devised, and will, no doubt, become popular if the storage battery is not too

heavy. Another scheme for an electric lamp to light the bicyclist's way provides for the generation of a current by a dynamo, worked simultaneously with the machine itself by the rider's pedals; but this is open to the objection of unsteadiness, due to differing speeds and to complete extinguishment when the wheel stops. This trouble might be obviated by the use of an auxiliary storage battery, and it is possible that this plan will eventually be adopted.

"Electrical apparatus to facilitate the playing of heavy church organs has long been familiar, but now an inventor comes forward with a scheme for operating the various mechanical pianos and organs on the market by the mystic current's aid. Attached to the musical instrument is the flexible cord containing the electrical wires, while at the free end of the cord there is a plug to be screwed into the incandescent lamp socket in place of the lamp plug. All that remains to be done after that is to turn the switch, and then the instrument plays."

Few inventors of such contrivances as have been described get fortunes from their inventions. These yield fortunes sometimes, it is true, but the profit generally goes to big corporations and not to individuals. Every big electrical corporation, like the General Electric Company, the Westinghouse Company, etc., has a number of electrical experts employed at good salaries to do little else but make experiments along lines suggested by themselves, by the officers of the corporation or by the demands of trade. Some of these inventors get something extra when they hit a good thing, but more do not. This scheme may not seem entirely fair at first blush, but of all such experts with whom the writer has talked about the matter not one complains.

"It costs a good deal of money to make electrical experiments," said such an expert. "I myself have taken out thirteen patents, six or seven of which have become commercially profitable, and the company has made a good deal more money out of them than I have. But, as a matter of fact, the inventions were as much the product of the company's money, placed at my disposal for experimental purposes, as of my own ingenuity. I could not have afforded to make the experiments myself, and, unless I were an exceedingly rich man, would not have been willing to do so even if I had had money enough, for the plant with which I work cost tens of thousands of dollars, and much of my work goes for naught. Under the arrangement as it now stands I get my salary, that is ample for my needs, and my income is steady. I have no financial distractions to hamper me in my work, and I can go ahead giving my undivided attention to the development of my ideas, certain that whether what I am doing at the time proves successful or not I shall not suffer in my income."

## Electric Railway Work in England.

IN referring to what may be expected to happen in electrical progress in England during the ensuing year *London Lightning* says: "In 1897 the scope of the industry will be greatly extended by the demand for steam and electrical plant and accessories for tramway work. American firms, with all the advantages of an immense home demand, mean to do their best to corner the British trade in this department. Fortunately, however, our electrical engineers are not, as a class, afflicted with the apathy of many of the old-established engineering firms. They are as keen and energetic a set of men as are to be found in this or any other country, and the uphill fight from which electric lighting has now emerged victorious has taught them many lessons—among others, how to learn."

The sale of American electric railway appliances in England has already been comparatively large. It is also understood that one of our prominent truck manufacturers has in contemplation the establishment of a truck factory in England. We do not believe that Americans have any idea of exactly cornering the electric railway market in England, because they know such a thing would be impossible. But we do believe that they intend to sell just as many goods as they can while our British brethren are making up their minds what to do. "Hustle" counts in England as well as in America.

—The sawmill of the American River Land and Lumber Company, which is located close to the power house at Folsom, Cal., of the Folsom-Sacramento Power Transmission, was started successfully on December 1st, cutting 50,000 feet of lumber per day. The saw mill is the first in the world, so far as known, which is operated by electricity. The current is three-phase, taken from the power house at Folsom, and the motors are all of the induction type, the installation having been made by the General Electric Company. The motors employed are one of 75 horse power, one of 50 horse-power, both running at 720 volts, three of 30 horse-power, and one of 5 horse-power operating at 200 volts.

—In a published list of thirty-six of the more important recent installations of Pelton water wheels in connection with electrical power transmission, we notice that eleven were in foreign countries, beside two in Alaska. The locations were Chili, Brazil, Guatemala, Hilo (Hawaiian Islands), South Africa, British Columbia, Japan, Mexico, two, and Venezuela, two. All the other installations mentioned were in far Western States of this country.

—A New York exporting house will shortly ship to Buenos Ayres a quantity of electric railway supplies. Some of the horse car lines of that city will shortly be supplanted by the trolley system. A 750 horse-power engine is included in the shipment.

—Electric power for drawbridges is to be adopted for all the bridges over the Chicago river at Chicago, Ill., replacing steam plants now required for each bridge.

—Telephone material in considerable quantity is being sent to Colombia. Recently one invoice amounted to \$16,000 for Bogota alone.



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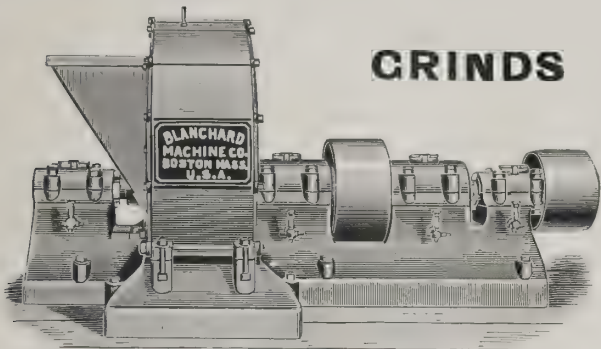
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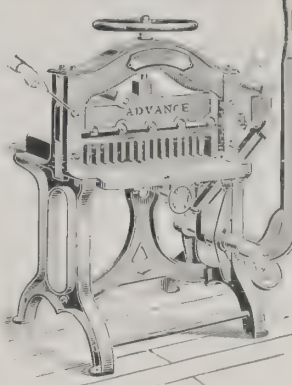
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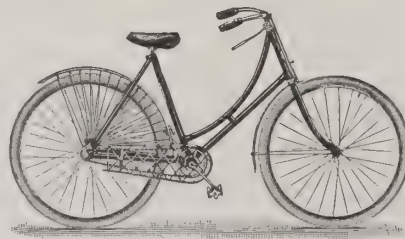
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Price \$100. Weight 23½ lbs.

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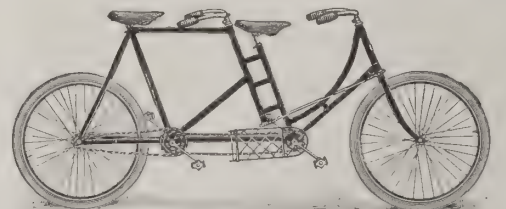
**TRIBUNE MODEL 24.** Price \$100.

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### Bicycle with Gunpowder Motor.

**T** M. FREEBLE, a merchant of Latrobe, Pa., has invented a most remarkable motor which, with a weight of  $8\frac{3}{4}$  pounds and a length of 8 inches, will, when charged with ordinary gunpowder, carry a machine and rider 100 miles. Experiments and practical road tests have demonstrated the entire practicability of the motor, and its general use by the hundreds of thousands of wheelmen throughout the country is only a question of the near future.

A series of explosions as a motive power seems somewhat odd at first thought, and yet when this invention is considered in all its details its method of operation is apparent to all and its manifest advantages over the present pedal and sprocket system is evident. The adoption of this powder motor by bicycle riders means much to the wheeling world. It means that the steepest hill can be taken with the ease of the smoothest turnpike and also that the matter of speed is practically limited only by the inclination of the rider. It means also that all the pleasure and excitement of wheeling can be enjoyed without any of its attendant fatigues and finally that there is no rattle, rumble or jar, as with many other motor machines, to disturb the thoughts or conversation of wheelmen or women as they ride through finest shaded roads or country lanes. This motor entirely does away with that bugbear of wheeling, the sprocket chain, and also the pedal, and at the same time occupies but little more than the same space.

In appearance the small cylinder of the motor is 3 inches long and 1 inch in diameter, at the forward end of which is a box known as the exploding chamber. This is 2 inches long,  $1\frac{1}{2}$  inches high and  $1\frac{3}{4}$  inches wide. From the rear end of the cylinder projects the driving rod. Above the cylinder is the powder magazine, 4 inches in diameter and 2 inches deep. It is from this magazine that the explosive is supplied, by means of a feeder, to the exploding chamber below.

The motor is fastened onto an ordinary machine in place of pedals and sprocket chain. The driving rod, which takes the place of the chain, is similar in action, although naturally much smaller than the driving rod of an ordinary engine. The end of this rod, which projects from the cylinder, connects with a crank attached to the eccentric, which in turn is fastened to the axle of the rear wheel of the machine. The forcing outward of the driving rod from the cylinder causes the crank to revolve and this in turn communicates the motion to the eccentric and wheel, giving motion to the machine. The motor is 1 horsepower and the powder magazine has a capacity of 5 pounds. From the front of the magazine extends downward a chute leading into the exploding chamber. Within the chute there is a system of valves governed by a rod, which follows the frame of the machine up and over the forward wheel to the handle bar. This rod is used to control the speed of the machine, and also used as a brake when a gradual stop is desired.

The valves in the feed chute work on what might be called an open-and-shut principle. There are three of them, an upper, middle and lower one. When one is open the other two are closed. That this may be accomplished the valves are connected by a bar which has at the upper end a cogwheel fitting into a smaller cog, which governs the valve opening directly from the magazine into the chute. The second valve is midway between the others and acts as a governor to both, shutting off the supply when the speed is too rapid and increasing it when more speed is desired. The third or lower valve opens directly into the exploding chamber and is much heavier than the others, for the reason that it has to withstand the force of concussion and strain caused by the exploding powder.

The exploding chamber is the heaviest part of the motor. It is constructed of steel and in it the powder explodes as it comes from the magazine through the feeder. As the explosion occurs a gaseous smoke is generated, which acts much the same as steam in that it operates the piston-head of the driving rod within the cylinder, one end of which is connected with the exploding chamber. As the volume of this gaseous smoke is increased the action of the rod is proportionally increased, and an increase of speed results. To avoid any possibility of explosion of the gases generated by the exploding powder there is a valve at the top of the exploding chamber through which the excess of gas is automatically allowed to escape.

The speed of the machine to a certain extent regulates the action of the valves in the supply chute. There is a small thumbscrew arrangement in the chute which adjusts the angle of the back of the chute, forcing it nearer the valves or increasing the speed as the rider may wish. A rod working from the rear wheel to the chute opens and closes the valves as the wheel revolves and thus allows the powder to escape from the magazine.

The powder is exploded in the exploding chamber to make a start in the first instance by concussion. There are a series of caps so arranged within the chamber that every pressure to the full extent of the governing rod leading to the handle bar explodes one. When the rider wishes to start the rod is forced down, the valves in the chute are opened and a cap within the chamber is exploded, causing the machine to start. Just the reverse operation causes the entire machinery to stop. The drawing upward of the rod shuts the valve, causing the flow of powder to cease, and as no more gaseous smoke can be generated the machine comes to a gradual stop. To make a sudden stop the ordinary brake is used.

The motor is fastened onto the frame of the machine by a clamp, which is in reality a portion of the cylinder, and when secured fast nothing except the breaking of the machine frame can displace the motor from its position. So little powder is exploded at a time that there is no smoke and no odor, and the action of the motor is so even that riding on a machine worked by this method of propulsion is much like coasting down a good hill on an ordinary machine. Footrests instead of pedals are placed at the forward part of the machine on either side of the fork, but are much wider than the ordinary rests, so that there is no fatigue resulting from keeping the feet in one position for an extended length of time.

### To Fight Fire.

**A** WESTERN cycle manufacturing concern has received an order for a complete fire-department outfit mounted upon bicycles. These bicycles are not for the firemen to ride alone, but the whole paraphernalia of the department used in the subduing of fires is to be mounted upon machines of the bicycle pattern. A chemical engine forms an important portion of this novel apparatus. This engine is exactly similar to that in use by many of the fire departments in the country. It is equipped with the regulation lanterns, fire axes, crowbars, pike poles, etc. The engine carries also the regular chemical fluid.

Considerable attention the country over has been turned to the cycle fire apparatus, and the consensus of opinion seems to be that no adequate reason can be advanced to prove that it is not practical. It is not probable that for any large cities, where the buildings are extremely high and where street traffic is heavy, the bicycle fire apparatus will come into use to any great extent, but in small towns and villages a fire department in which even the hook and ladder can be a bicycle contrivance on the order of one tried successfully in a Western town would seem to be a solution to a question which has troubled some late-born centres of social life. The lesser expense attached to the maintenance of a bicycle fire department will be a big inducement to the taking up of the idea by small towns and cities, when it is presented to them in practical shape.

### A Marine Bicycle.

**S**TYLES E. MAXON, of Portland, Me., has a marine bicycle which he openly stakes against the world. He has patented it and wagers it to beat anything that navigates the water in bicycle form. It is cigar shaped and consists of an aluminum cylinder ten feet long, tapering toward each end. Underneath it, buried in the water, is a large keel precisely like that of a racing yacht.

There is regular bicycle machinery attached to the cigar-shaped craft. A large sprocket wheel, a housing for the sprocket chain and a simple driving mechanism all correspond closely to the land wheel. The pedals turn the sprocket wheel, which in turn causes the cigar-shaped cylinder to revolve. It goes around with the rapidity of lightning and pushes or screws its way through the water. At the back there is a rudder for steering, which is controlled by the handle bars. The speed that can be obtained by this wheel is not yet known. Like a bicycle, it depends upon the rider.



### Large Bicycle Sprockets.

ONE of the features proposed for '97 bicycles is an increase in the size of the sprockets. The demand for this change is attributed to articles published in mechanical papers, pointing out the alleged manifest advantage of the larger sprocket, under some conditions.

The theory is that chain friction decreased in direct ratio with the increase of diameter of sprockets. This theory, a Providence mechanic says, would be right if it were not for complications which must follow. In making the sprockets larger there are more teeth to engage and disengage with the chain, and this must mean friction which in some measure offsets the advantage of the increased diameter of the gears.

The most popular explanation of the desire for large gears is that the chain bends easier or with less friction around a large diameter, and this is true. A very small sprocket causes the chain to work on its rivets, producing some friction, even in the most perfect chain. The chain appears to the eye to be far too stiff to accommodate itself to the six-tooth sprocket on many machines. In fact, a seven-tooth sprocket probably will be called small this year. If, however, the chain is removed it will be found to be far more flexible than it looks; a small leather belt is very stiff in comparison, and a belt capable of transmitting as much power as the chain could not be made to hug a pulley as small as the rear sprocket.

It will be found that a chain bends easily around a five or possibly a four-tooth sprocket. But there are objections to extremely small sprockets. The pull of the chain is not powerful. The chain is carried too close to the hub, necessitating a long hub, and the smaller number of teeth wear out faster. The five and six tooth sprockets have probably gone out of fashion forever. The seven or eight tooth will not die so easily.

The claim that a nine-tooth sprocket has better leverage is only true when the front sprocket remains the same; if the front sprocket is proportionately increased in size the leverage gained disappears. Power can be gained only at the expense of speed. Or, in other words, power means a low gear, and the tendency of riders is in the opposite direction. Gears are higher, and the majority of riders prefer speed to power.

An increase of gear diameter would require a longer chain, which must run farther, and consequently faster, for the same speed of the bicycle; and this high speed gives a greater centrifugal force to the chain, which throws the chain out as mud is thrown from a wheel. This outward throw of the chain tightens it, and a chain that is quite slack at a slow speed becomes tight at a high speed.

This will put more strain on the bearings, as they will be pulled exactly as if the chain were too short, and thus stronger chains and sprockets are needed. The weight consequently will be increased. Here will be found the fatal objection to large gears with a long chain. When the rider finds that it makes his machine heavier he will abandon it for a seven or eight tooth sprocket.

A 68 is an average gear. It is obtained with 17 front and seven rear teeth. Putting only one more tooth on the rear sprocket reduces the gear to 59, and to maintain about the rate of speed of the 68 with eight rear teeth it will be necessary to add three teeth to the front sprocket. With 20 and eight teeth the bicycle will move six inches farther for each revolution of the cranks than with the 17 and seven combination. With nine teeth for the rear sprocket, as is proposed, the front sprocket must have 23 teeth to give about the speed of the smaller sprocket. The diameter of a 17-tooth sprocket is five and three quarters inches, and a 23 tooth sprocket is seven and three fourths inches. The circumference of the latter is about six inches greater than that of the 17-tooth sprocket, and what is to be gained by using a ridiculously large and heavy sprocket is not very clear.

Those who are looking for a remarkable difference in the running of machines due to big sprockets will be disappointed, and rational riders will not call for a rear sprocket with more than eight teeth. No complication of sprockets will make any more power than is put into the crank. No addition of levers or gearing can possibly create power and at the same time maintain the speed. The heaviest part of a bicycle at present is the propelling apparatus, and improvement lies in simplifying, not in adding more parts.

After all, perhaps the strongest reason for the adoption of large gears is the fact that they are supposed to be stylish.

### Bicycle Items.

—The steamer *Advance*, sailing on the 30th instant, will take about fifty bicycles of different makes on orders from the cities of Callao and Payta, in Peru. It is believed that considerable business in this direction may be anticipated from these markets, due to the enthusiasm likely to awaken in Peru. Parties there have recently been advised that an extensive bicycle academy is under consideration to be erected at Exposition Park, Lima.

—American bicycle manufacturers, not satisfied with making the best wheels in the world, are printing books to teach how to keep their wheels in best repair for the longest time. Three thousand books of one author on bicycle repairing have been sold in Sydney, Australia, lately.

—American bicycles are said to be finding their way into Arabia. There may not be as much poetry about the Arab steed of the future as there was about that of the past, but it will go faster.

—Bicycle locks are now made with an alarm operated by clockwork. The lock proper is a U shaped fork, fitting tightly on the front wheel, so that the slightest turn of the wheel starts the alarm ringing.

### Bicycle Models for 1897.

THE arrangements of the leading bicycle manufacturers show that a prominent feature in 1897 models will be the reduction in the use of bolts and nuts at the handle bar and at the seat-post cluster. Treads will be narrower and hubs will be larger. Larger balls will be used in the bearings. Many makers will provide sufficient fork side clearance for larger tires. And not a few manufacturers anticipate that gear cases will be in demand. A tendency to part with accepted forms of crank construction is noted among a few makers. The round crank bids fair to be superseded by its square relative. In the frames no radical alteration will appear. The crank hanger, however, will have in numerous instances a greater drop from the rear hub than last year. Naturally that will be conducive to speed and ease of propulsion. This year's models will, as a rule, be from one to two pounds heavier. Dozens of different two-piece crank axles will be embodied in the new models, and to them the cranks will be, as a rule, attached without the use of unsightly cotter pins. As for bearings, they will be, as the makers say, dustproof. In most cases they will be of the three-point, disk-adjusting, ball-bearing order. Among the makers of tires it is generally agreed that pneumatics will be heavier. Some makers will retain the smooth tire, but many of them will present a tire with roughened tread. Various methods of producing that effect will be resorted to. Some tires will be what is technically called serrated. Others will be corrugated, honeycombed or pebbled, and one Eastern tire will look like a section of a small alligator's back.

### Device for Cleaning Bicycle Chains.

A NEW bicycle chain cleaner has just been patented. It is simple and durable in construction, very effective in operation, and arranged for conveniently attaching it to or detaching it from the bicycle frame. The inventor is Eney Grupelli, of New York, and the invention consists principally of two revolvable brushes located one directly above the other, and between which passes the run of the bicycle chain, so that when the bicycle is in motion the run is acted on by the two brushes, which in revolving clean the chain of any impurities adhering thereto, such as dust and the like. The brushes can be moved toward or from each other by the operator simply turning the knob provided. The device is both useful and convenient, and can readily be applied or removed from the bicycle.

### Useful Inventions.

W. G. REITER, New York, has invented a combined letter-box and postage-stamp vending machine. A penny dropped into a slot will liberate a one-cent postage stamp, and two cents deposited into another slot will cause a two cent stamp to appear. The stamps will be furnished in a roll upon a spool under the new invention, and will only unravel so that one at a time can be purchased. As soon as the stamps are gone the slot closes. In addition to the slot device Mr. Reiter has an invention which, by means of a dial upon the box, fixes the time of collection.

An invention which will prove useful to ticket agents or any one having a large number of tickets to be disposed of rapidly is a case to hold the tickets, in the side of which is a spring slide, which, when pushed toward the end of the box, brings the tickets out through a slot one at a time, one side wall of the box being held by springs in order to keep the tickets pressed against the slide.

One of the most novel excavating machines of recent date has been patented by a North Dakota man, and consists of two immense earth augers, attached to a portable upright frame, and operated by power, the augers bringing the earth to the surface, where it can be shovelled to one side. When the excavation is deep enough the machine is moved forward to a new section of ground. Another style of the same machine has a horizontal auger for boring under street crossings, etc.

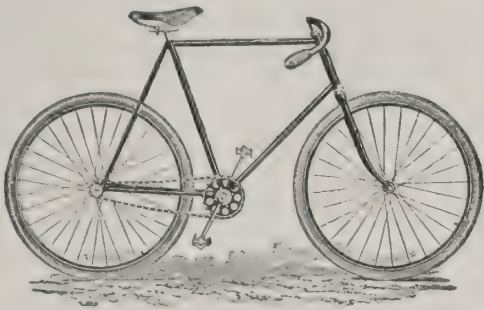
Charles Wallace, a Colorado miner, has invented and patented an improved stamp mill, which is now on exhibition at the shops of the Enterprise Machinery Works, 1436 Blake street, Denver, Col. The device has two motions in treating ore, breaking and grinding, as the stamp, about 800 pounds, turns one and one-half times after striking, thereby grinding the ore. The striking process is about thirty strokes per minute. A forty-mesh screen is used. The machine is very easily moved from place to place, as it can be taken apart very rapidly. Its capacity is a ton of ore in six hours. There is only one stamp to look after, but as many as are necessary can be built. The entire weight is one ton. A four-horse power engine is all that is required to run the mill.

A RECENT communication from the far East to merchants in this city gives the following information regarding the opportunities for trade: "Neither Asiatic Russia nor China is likely to develop manufacturing industries, except in a crude way, for a long time. The Russian policy is and will likely continue to be one of protection to home industries. The Chinese markets, as far as possible, will be controlled by Russia and kept for her benefit. Her efforts in this direction must necessarily be restricted, however, by the fact that neither she nor China is yet able to supply many things that are absolutely necessary to industrial development on modern lines. Both countries will probably be obliged to import large quantities of machinery, agricultural implements, railroad material, electrical apparatus, etc., and with the growth of civilization among her eastern population a host of minor articles, in the production of which American manufacturers excel, will be in demand."



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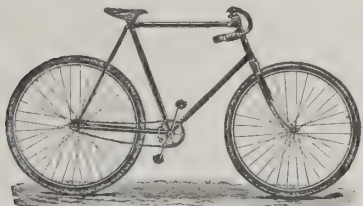
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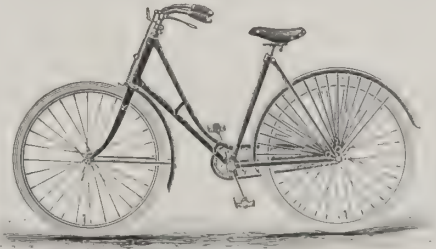
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Patee bicycles have a world-wide reputation because they are always "up-to-date" in every particular, and also because only the very best material is used in their construction.

They are built by the oldest and best-known high-grade bicycle men in America, and the '97 model embodies some new and special features that will fascinate wheelmen and dealers instantly.

The one-piece crank shaft and cranks, the thorough dust-proof device, the quality of tool steel in bearings, the manner of re-enforcing, the adjustable bar and manner of locking in the head are all new and special features used exclusively on the "Patee" (our own patents).

Do not contract for '97 without getting our catalogue and prices and seeing sample. It is unblushingly and emphatically the best bicycle in the world for the money, and is guaranteed equal to any bicycle in the world. American list, \$60.00. Liberal discount to dealers. Do not be afraid to write. We want your business and will take pleasure in telling you more about our wheel. Address

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### Across the Atlantic in Three Days.

THERE will be tested this month at Providence, R. I., an electric ship of such marvellous speed that it will set the tongues of all the world wagging. Here a new record is to be born, a new speed limit, or rather a speed without limit, to be practically demonstrated. The electrical wonder has no name as yet, but she has fourteen propellers. Mr. George A. Jencks, manager of the Painton Electrical Steamship Company, of 155 Orange street, Providence, R. I., tells the writer that from private trials there is no doubt whatever of a 40-knot speed being attained.

The ideas that have been put into practical execution in this marine wonder have been kept so strictly concealed that few persons have had the remotest notion that any such revolution in marine engineering was even contemplated. Ever since electricity has shown itself to be the capital power of propulsion for vessels of light proportions there has been endless theory as to the possibilities of the power in the future.

Now, however, we are to have practice and not theory in the form of a ship that will speed across the ocean and away past Fastnet Light and the Lizard in less than three days. Think of an ocean voyage that is much shorter and far more comfortable, though the journey may be from New York to Southampton, than can be said of a trip across our own United States.

By the use of the Painton system of electric motors it will be possible to obtain double the speed reached by steam and at about one-half the cost, and with a plant that will occupy not more than one-half the space now required for the ponderous marine engines and accompanying machinery. Ocean "greyhounds" equipped with the Painton motors will easily cover 40 knots an hour, railroad speed. Warships will reach the speed of 35 knots an hour, whereas the highest limit yet accomplished on a trial mile with steam is 22.80 knots with the fastest cruiser built.

One great source of complaint with the Navy Department has been the insufficiency of room in war vessels for the accommodation of men, armament, coal and provisions. The machinery necessary to propel these great ocean fortresses occupies such a large amount of space that there is practically no room for anything else. The terrific heat from the furnaces and steam pipes, the maddening hissing of the steam and the incessant vibration and shocks resulting from the wrenching of the heavy shafts and the straining of the mechanism make life almost unendurable and convert the vessels into veritable hells. They are torture prisons from which there is no escape.

The Painton system of motors will have greatly enlarged power over steam and, as before stated, the electrical plant will occupy half the space of the steam plant. Instead of the enormous eighty-ton shafts, extending from the middle of the ship to the stern, the electrical plant will have from fourteen to sixteen screw propellers ranging along the sides of the vessel, as well as two of ingenious construction at the stern. These propellers are operated from a switchboard. They can be operated singly or all together, at the will of the man at the keys. Each propeller is a machine by itself, and the disabling of one or more has no effect whatever on the others. When the entire complement of propellers is in action there is no more noise than would come from the action of a flywheel.

There is no jar caused by the horizontal motion; no excessive heat from steam piping. The long shafts are done away with, and the terrific straining coming upon the engines and shafts when submerged and then the next moment running with full speed, "racing speed," on account of the pitching of the vessel, is avoided. The total horse power is distributed throughout the entire system of propellers so that it would be absolutely impossible to have more than one-quarter of the whole power or propellers "racing" at one time.

The engines that generate the power are not mechanically connected with the propellers, as is now the case in steam vessels, but the power is transmitted by electric wires direct to motors built on propeller shafts. The machinery is simplicity itself. No belting or coupling is required. The propellers all work direct and, as before noted, they can be operated singly or together. If one breaks down, or two or three, or any number, those that are left can do the work. It would not be possible for all to be disabled, as is now so often the case with vessels equipped by steam, leaving them floundering for days at the mercy of the elements.

From 136 to 150 revolutions of the screw per minute is about the limit of steam power. There is practically no limit to the speed of a screw operated by electricity. Eighteen hundred revolutions per minute and higher have been reached by the Painton motors. In practice, 650 to 800 revolutions per minute can be safely depended upon.

In a large cruiser, of say 20,000 horse-power capacity, the transmission of power by steam would be at the expense of about 33 per cent. loss, or 6,600 horse power, whereas by electricity the loss would be only about 10 per cent., or 2,000 horse power, which is a saving over steam of 4,600 horse power. This will reduce the coal consumption about 23 per cent., an important economy. This, with the great speed attained by the new idea of the distribution of the propellers which tend to lift the bow of the vessel so as to reduce the friction of the water, will still further reduce the coal consumption to about one half that required for the generating of steam power. The saving by electricity extends through every part and feature. There is a saving of time, of space and cost of operation.

To illustrate: Where a steamship can now only take coal enough to carry her from New York to Liverpool an electrically equipped vessel by the Painton system could, with the same quantity of coal, sail from New York to Gibraltar and return to New York, three times the distance. The vessel could carry a greatly increased number of passengers and a much larger quantity of freight.

The space now required for the vast steam plant could be earning the owners of the vessel a vast amount of money. An ocean liner equipped with the Painton motors can easily carry 2,500 passengers in greater comfort and with less danger than is now incurred on steamships.

Another feature of the Painton system is the fact that the screws tend to maintain the equilibrium of the vessel at all times. Each screw has a distinct lifting power. The blades turn so that the propelling force comes from below instead of above, and as a vessel lurches from one side to another or pitches the screws on the side deepest in the water exert tremendous power to restore the craft to a level. It would be as though a man were to lurch to one side and receive the support of a prop. When the vessel pitches there is no loss of motion. When the stern screws are idle and in air for a moment the screws in the bow are working as usual and exerting their tremendous lifting power to put the stern of the boat back to its proper equilibrium. When the bow screws are under water the stern screws perform a similar office. In this way the vessel is kept more nearly on an equilibrium than is possible in steamships.

The increased speed attained by the use of the Painton electrical motors does not, as many might suppose, increase the pressure of the water upon the sides of the vessel. Just the contrary is the case. The increased momentum enables the vessel to cut the water with a sharper force, and the greater the momentum the less the pressure. This can best be illustrated by a man attempting to push his fist through a board. This he cannot do, yet he can easily shoot a candle through it from a gun.

Ocean greyhounds, which at the present can attain a speed of 20 knots an hour under steam, can, when fitted with the Painton system of motors, easily attain a speed of 40 and more knots an hour, which is in reality faster than the time by an ordinary railroad train.

With the success of the Painton boat begins a new era in maritime history. It means that the oceans will be robbed of much of their peril. It places the continental journey in the same category with the tourist as the trip to the mountain or lake Summer resort.

### Trade Prospects in Japan.

JAPAN is the most wonderful country to-day, whether we regard it from an artistic or a commercial and industrial point of view. Within the past twenty years that country has manifested a spirit of progress that is without a parallel so far as we know. Among recent events there is nothing more remarkable than the patriotism and heroism displayed by the Japanese during the war with China. The spirit displayed was absolutely irresistible, and demonstrated that a new factor had arisen among the nations of the earth.

The conditions of the new civilization in Japan are compelling that country to reach out in many directions to supply national needs which did not exist formerly. One of these, in which we ought to take particular interest, is the meat supply of the Empire. Some time ago the Japanese Government reached the conclusion that its people were smaller and physically weaker than Europeans because their diet was confined to rice and fish, and at once preached meat as a patriotic duty. As a consequence the Archipelago has been nearly stripped of its native live stock, the demand is growing rapidly, and the 40,000,000 Japanese will buy enormously of meat products from somebody, for several years to come at any rate. A handsomely subsidized steam line has just been put on between native ports and Australia, and the Australians will probably capture a good share of the trade in tinned meats and refrigerated carcasses.

Japan has a cavalry service of 20,000 troops. The Japanese ponies are unfit for the purposes of this force, while the tough, wiry horses of our far Western States would meet the requirements better than any animals available elsewhere.

In Japan, American locomotives are preferred to all others. Recently an order for nineteen engines, first class, was received from the land of the Mikado. Price, \$15,000 for each engine; total, \$285,000. Nice start off that. Keep it moving. We repeat, the Japanese prefer American locomotives to all others. They are lighter, stronger and better looking. It looks now as if Japan would in the future stock all her railroads with goods purchased in the United States. Uncle Sam will sell to the Mikado 1,000 locomotives during the next ten years.

—A train made up of about twenty flat cars, all loaded with boilers, engines, shafting and other castings, was recently shipped by the Reliance Works, of Milwaukee, Wis., and was consigned to a firm in Trieste, Austria.

—Thirteen million square feet of American lumber were imported into China last year, and according to United States Consul Jernigan at Shanghai, most of this came from Washington and Oregon. The Chinese have completely stripped Eastern China of its timber and are now drawing upon our timber.

—One of the simplest non-refillable bottles recently patented has the neck curved beyond the length of the ordinary neck. The cork has a metal top and can be pushed down into position in the straight portion of the neck, but cannot be removed without breaking the neck of the bottle, on account of the arch in the neck.

—The *Times*, of India, in discussing the violations of the Merchandise Marks Act, says "the Japanese are the leading offenders. Their ingenuity during the year under review was mainly confined to the export of pencils, clocks, soaps, umbrellas and matches, all of which were fraudulently marked. 'The English pencils of the Eagle Pencil Manufacturing Company, New York,' was the inscription on one large Japanese consignment, while an immense quantity of clocks bore the words 'The Waterbury Clock Company, U. S. A.,' whereas all of them were made in Osaka."





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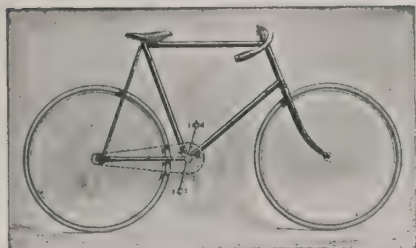
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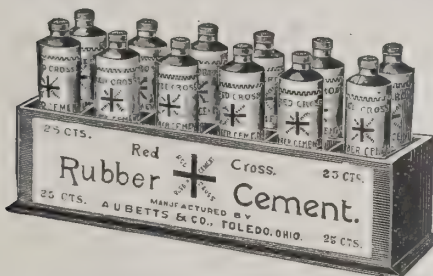
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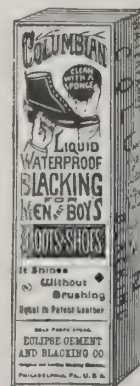
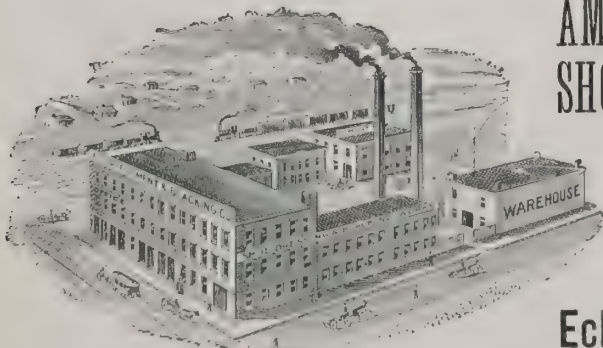
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Write for Illustrated Catalogue.





FOREIGN WEIGHTS AND MEASURES WITH AMERICAN EQUIVALENTS.

To assist the readers of THE AMERICAN EXPORTER in their correspondence with American manufacturers, we print below tables of weights and measures and their American equivalents:

FOREIGN WEIGHTS AND MEASURES.

Prepared by the Bureau of Statistics, Department of State, U. S. A.

Denomina-tions.	Where used.	American equivalent.	Denomina-tions.	Where used.	American equivalent.	Denomina-tions.	Where used.	American equivalent.
Almude.....	Portugal.....	4.422 gallons.	Fanega (dry) ..	Chile.....	2.575 bushels.	Oke.....	Turkey.....	2,854.18 pounds.
Ardeb.....	Egypt.....	7,690.7 bushels.	do.....	Cuba.....	1,590 bushels.	do.....	Hungary, Wallachia	2.5 pints.
Are.....	Metric.....	0.02471 acre.	do.....	Mexico.....	1,547.28 bushels.	Pic.....	Egypt.....	21.4 inches.
Arohe.....	Paraguay.....	25 pounds.	do.....	Morocco.....	Strike fanega 70 lbs.; full fanega 115 lbs.	Picu.....	Borneo and Celebes.	135.64 pounds.
Arratel or libra.	Portugal.....	1.111 pounds.	do.....	Uruguay (double)	7,776 bushels.	do.....	China, Japan and Sumatra.	133 1/2 pounds.
Arroba (dry) ..	Argentine Republic	25.8175 pounds.	do.....	Uruguay (single)	3,888 bushels.	do.....	Java.....	135.1 pounds.
do.....	Brazil.....	32.38 pounds.	do.....	Venezuela.....	1,599 bushels.	do.....	Philippine Islands	139.45 pounds.
do.....	Cuba.....	25.3664 pounds.	Fanega (liquid)	Spain.....	16 gallons.	do.....	Philippine Islands	140 pounds.
do.....	Portugal.....	32.38 pounds.	Feddan.....	Egypt.....	1.05 acres.	Pie.....	Argentine Republic	0.9478 foot.
do.....	Spain.....	25.36 pounds.	Frail (raisins).	Spain.....	50 pounds.	do.....	Castilian.....	0.91407 foot.
do.....	Venezuela.....	25.4024 pounds.	Frasco.....	Argentine Republic	2,500 quarts.	Pik.....	Turkey.....	27.9 inches.
Arroba (liquid).	Cuba, Spain and Venezuela.	4.263 gallons.	do.....	Mexico.....	2.5 quarts.	Pood.....	Russia.....	36.112 pounds.
Arshine.....	Russia.....	28 inches.	Fuder.....	Luxemburg.....	264.17 gallons.	Pund (pound).	Denmark, Sweden.	1.102 pounds.
Arshine (-qu're)	do.....	5.44 square feet.	Garnice.....	Russian Poland	0.88 gallon.	Quarter.....	Great Britain.....	8.252 bushels.
Artel.....	Morocco.....	1.12 pounds.	Gram.....	Metric.....	15.432 grains.	do.....	London (coal).....	36 bushels.
Baril.....	Argentine Republic and Mexico.	20.0787 gallons.	Hectare.....	do.....	2.471 acres.	Quintal.....	Argentine Republic	101.42 pounds.
Barrel.....	Malta (customs).....	11.4 gallons.	Dry.....	do.....	2,838 bushels.	do.....	Brazil.....	130.06 pounds.
do.....	Spain (raisins).....	100 pounds.	Liquid.....	do.....	26,417 gallons.	do.....	Castile, Chile, Mex-ico and Peru.	101.61 pounds.
Berkovet.....	Russia.....	361.12 pounds.	Joch.....	Austria-Hungary	1.422 acres.	do.....	Greece.....	123.2 pounds.
Bongkal.....	India.....	832 grains.	Ken.....	Japan.....	4 yards.	do.....	Newfoundland (fish)	112 pounds.
Bouw.....	Sumatra.....	7,096.5 qu're metres.	Kilogram (kilo)	Metric.....	2,204 pounds.	do.....	Paraguay.....	100 pounds.
Bu.....	Japan.....	0.1 inch.	Kilometre.....	do.....	0.621375 mile.	do.....	Syria.....	125 pounds.
Butt (wine).....	Spain.....	140 gallons.	Klafter.....	Russia.....	216 cubic feet.	do.....	Metric.....	220.46 pounds.
Caffiso.....	Malta.....	5.4 gallons.	Kota.....	Japan.....	5.13 bushels.	do.....	Palestine.....	6 pounds.
Candy.....	India (Bombay).....	529 pounds.	Korree.....	Russia.....	3.5 bushels.	Rottle.....	Syria.....	5 1/2 pounds.
do.....	India (Madras).....	500 pounds.	Last.....	Belgium, Holland.	85.134 bushels.	Sagen.....	Russia.....	7 feet.
Cantar.....	Morocco.....	113 pounds.	do.....	England (dry malt).	82.52 bushels.	Salm.....	Malta.....	490 pounds.
do.....	Syria (Damascus).....	575 pounds.	do.....	Germany.....	2 metric tons (4,480 pounds.)	Se.....	Japan.....	3.6 feet.
do.....	Turkey.....	124.7036 pounds.	do.....	Prussia.....	112.29 bushels.	Seer.....	India.....	1 pound 13 ounces.
Cantaro, Cantar	Malta.....	175 pounds.	do.....	Russian Poland.....	11 1/2 bushels.	Shaku.....	Japan.....	10 inches.
Carga.....	Mexico and Salvador	300 pounds.	do.....	Spain (salt).....	4,760 pounds.	Sho.....	do.....	1.6 quarts.
Catty.....	China.....	1.333 1/2 (1 1/3) pounds.	League (land) ..	Paraguay.....	4,633 acres.	Standard (St. Petersburg).	Lumber measure.....	165 cubic feet.
do.....	Japan.....	1.31 pounds.	Li.....	China.....	2,115 feet.	Stone.....	British.....	14 pounds.
do.....	Java, Siam, Malacca	1.35 pounds.	Libra (pound) ..	Castilian.....	7,100 grains (troy).	Suerte.....	Uruguay.....	2,700 cuadras (see cuadra).
do.....	Sumatra.....	2.12 pounds.	do.....	Argentine Republic	1,012 pounds.	Tael.....	Cochin China.....	590.75 grains (troy).
Centaro.....	Central America.....	4,263 gallons.	do.....	Central America.....	1,043 pounds.	Tan.....	Japan.....	0.25 acre.
Centner.....	Bremen, Brunswick	117.5 pounds.	do.....	Chile.....	1,014 pounds.	To.....	do.....	2 pecks.
do.....	Darmstadt.....	110.24 pounds.	do.....	Cuba.....	1,016 pounds.	Ton.....	Space measure.....	40 cubic feet.
do.....	Denmark, Norway.....	110.11 pounds.	do.....	Mexico.....	1,014 1/2 pounds.	Tonde (cereals) ..	Denmark.....	3,947.83 bushels.
do.....	Nuremberg.....	112.43 pounds.	do.....	Peru.....	1,014 1/2 pounds.	Tondeland.....	do.....	1.36 acres.
do.....	Prussia.....	113.44 pounds.	do.....	Portugal.....	1,011 pounds.	Tsubo.....	Japan.....	6 feet square.
do.....	Sweden.....	93.7 pounds.	do.....	Uruguay.....	1,014 pounds.	Tsun.....	China.....	1.41 inches.
do.....	Vienna.....	123.5 pounds.	do.....	Venezuela.....	1,016 pounds.	Tunna.....	Sweden.....	4.5 bushels.
do.....	Zollverein.....	110.24 pounds.	Litre.....	Metric.....	1,056.7 quarts.	Tunnland.....	do.....	1.22 acres.
do.....	Double or metric	220.46 pounds.	Livre (pound) ..	Greece.....	1.1 pounds.	Vara.....	Argentine Republic	34.1208 inches.
Chih.....	China.....	14 inches.	do.....	Guiana.....	1,079.1 pounds.	do.....	Castile.....	0.914117 yard.
Coyan.....	Sarawak.....	3,098 pounds.	Load.....	England (timber) ..	Squ're, 50 cubic feet; unhewn, 40 cubic feet; inch planks, 600 superficial feet.	do.....	Central America.....	38.874 inches.
do.....	Siam (Koyan).....	2,667 pounds.	Manzana.....	Costa Rica.....	1 1/2 acres.	do.....	Chile and Peru.....	33.367 inches.
Cuadra.....	Argentine Republic	4.2 acres.	Marc.....	Bolivia.....	0.507 pound.	do.....	Cuba.....	33.384 inches.
do.....	Paraguay.....	78.9 yards.	Maund.....	India.....	82 1/2 pounds.	do.....	Curacao.....	33.375 inches.
do.....	Paraguay (square) ..	8,077 square feet.	Metre.....	Metric.....	39.37 inches.	do.....	Mexico.....	33 inches.
do.....	Uruguay (square) ..	Nearly 2 acres.	Mil.....	Denmark.....	4.68 miles.	do.....	Paraguay.....	34 inches.
Cubic metre.....	Metric.....	35.3 cubic feet.	do.....	Denmark (geograph-ical).	4.61 miles.	do.....	Venezuela.....	33.384 inches.
Cwt. (hundred-weight.)	British.....	112 pounds.	Morgen.....	Prussia.....	0.63 acre.	Vedro.....	Russia.....	2.707 gallons.
Dessatine.....	Russia.....	2,699.7 acres.	Oke.....	Egypt.....	2,725 pounds.	Verges.....	Isle of Jersey.....	71.1 square rods.
do.....	Spain.....	1,599 bushels.	do.....	Greece.....	2.84 pounds.	Verst.....	Russia.....	0.663 mile.
Drachme.....	Greece.....	Half ounce.	do.....	Hungary.....	3,081.7 pounds.	Vlocka.....	Russian Poland.....	41.98 acres.
Dun.....	Japan.....	1 inch.						
Egyptian w'ts. and measures.	(See CONSULAR RE-PORTS No. 144.)							
Fanega (dry) ..	Central America.....	1,574.5 bushels.						

Metric weights.

Milligram (1/1000 gram) equals 0.0154 grain.  
Centigram (1/100 gram) equals 0.1543 grain.  
Decigram (1/10 gram) equals 1.5432 grains.  
Gram equals 15.432 grains.  
Decagram (10 grams) equals 0.3527 ounce.  
Hectogram (100 grams) equals 3.5274 ounces.  
Kilogram (1,000 grams) equals 2.2046 pounds.  
Myriagram (10,000 grams) equals 22.046 pounds.  
Quintal (100,000 grams) equals 220.46 pounds.  
Millier or tonnes - ton (1,000,000 grams) equals 2,204.6 pounds.

Metric dry measure.

Millimetre (1/1000 litre) equals 0.061 cubic inch.

Centilitre (1/100 litre) equals 0.6102 cubic inch.  
Decilitre (1/10 litre) equals 6.1022 cubic inches.  
Litre equals 0.908 quart.  
Decalitre (10 litres) equals 9.08 quarts.  
Hectolitre (100 litres) equals 2.838 bushels.  
Kilolitre (1,000 litres) equals 1.308 cubic yards.

Metric liquid measure.

Millilitre (1/1000 litre) equals 0.27 fluid ounce.  
Centilitre (1/100 litre) equals 0.338 fluid ounce.  
Decilitre (1/10 litre) equals 0.845 gill.  
Litre equals 1.0567 quarts.  
Decalitre (10 litres) equals 2.6417 gallons.  
Hectolitre (100 litres) equals 26.417 gallons.  
Kilolitre (1,000 litres) equals 264.17 gallons.

THE METRIC SYSTEM.

Prepared by the Bureau of Coast and Geodetic Survey, U. S. A.

ELEMENTS OF THE METRIC SYSTEM.

Length.	Surface.	Capacity.	Weight.	Notation.
Myriametre.....			Metric ton.....	1,000,000
Kilometre.....			Quintal.....	100,000
Hectometre.....			Kilogram.....	10,000
Decametre.....			Hectogram.....	1,000
Metre.....			Decagram.....	100
Decimetre.....			Decalitre.....	10
Centimetre.....			Decilitre.....	1
Millimetre.....			Decigram.....	0.1
			Centigram.....	0.01
			Milligram.....	0.001

EQUIVALENTS OF CUSTOMARY AND METRIC WEIGHTS AND MEASURES.

1 kilometre.....	0.62137 mile.	1 mile.....	1.60935 kilometres.
1 metre.....	3.28083 feet.	1 yard.....	0.914402 metre.
1 centimetre.....	0.3937 inch.	1 foot.....	0.304801 metre.
1 hectare.....	2.471 acres.	1 inch.....	25.4001 millimetres.
1 are.....	119.6 square yards.	1 square mile.....	2.59 square kilometres.
1 metric ton.....	2,204.62 pounds.	1 acre.....	0.4047 hectare.
1 kilogram.....	2.20463 pounds.	1 square foot.....	9.29 square decimetres.
1 gram.....	15.43236 grains.	1 pound.....	0.453 59 kilogram.
1 hectolitre.....	2.8377 bushels.	1 grain.....	64.7989 milligrams.
1 hectolitre.....	26.417 gallons.	1 bushel.....	0.35239 hectolitre.
1 litre.....	1.0567 quarts.	1 gallon.....	3.78543 litres.
1 stere.....	1.308 cubic yards.	1 cubic foot.....	0.02832 cubic metre.

METRIC WEIGHTS AND MEASURES.

Prepared by the American Engineering firm of C. W. Hunt Co., New York, U. S. A.

Millimetres x 0.03937 = inches.  
Millimetres x 25.4 = inches.  
Centimetres x 0.3937 = inches.  
Centimetres x 2.54 = inches.  
Metres x 39.37 = inches. (Act Congress.)  
Metres x 3.281 = feet.  
Metres x 1.094 = yards.  
Kilometres x 0.621 = miles.  
Kilometres x 1.093 = miles.  
Kilometres x 3,280.7 = feet.  
Square millimetres x 0.0155 = sq. inches.  
Square millimetres x 645.1 = sq. inches.  
Square centimetres x 0.155 = sq. inches.

Square centimetres x 6.451 = sq. inches.  
Square metres x 10.764 = sq. feet.  
Square kilometres x 247.1 = acres.  
Hectare x 2.471 = acres.  
Cubic centimetres x 16.383 = cubic inches.  
Cubic centimetres x 3.69 = fl. drams.  
Cubic centimetres x 29.57 = fluid oz. (U. S. P.)  
Cubic metres x 35.315 = cubic feet.  
Cubic metres x 1.308 = cubic yards.  
Cubic metres x 264.2 = gallons (231 cu. in.)  
Litres x 61.022 = cubic in. (Act Congress.)  
Litres x 33.84 = fluid ounces (U. S. Phar.)  
Litres x 0.2642 = gallons (231 cu. in.)  
Litres x 3.78 = gallons (231 cu. in.)

Litres x 28.316 = cubic feet.  
Hectolitres x 3.531 = cubic feet.  
Hectolitres x 2.84 = bushels (2,150.42 cu. in.)  
Hectolitres x 0.131 = cubic yards.  
Hectolitres x 26.42 = gallons (231 cu. in.)  
Grams x 15.432 = grains. (Act Congress.)  
Grams x 981 = dynes.  
Grams (water) x 29.57 = fluid ounces.  
Grams x 28.35 = ounces avoirdupois.  
Grams per cu. cent. x 27.7 = lbs. per cu. in.  
Joule x 0.7373 = foot pounds  
Kilograms x 2.2044 = pounds.  
Kilograms x 35.3 = ounces avoirdupois.  
Kilograms x 1,102.3 = tons (2,000 lb.)

Kilogr. per sq. cent. x 14.223 = lbs. per sq. in.  
Kilogram-metres x 7.233 = foot lbs.  
Kilo per metre x 0.672 = lbs. per foot.  
Kilo per cu. metre x 0.026 = lbs. per cu. foot.  
Kilo per cheval x 2.235 = lbs. per H. P.  
Kilowatts x 1.34 = horse-power.  
Watts x 746 = horse-power.  
Watts x 0.7373 = foot pounds per second.  
Calorie x 3.968 = B. T. U.  
Cheval vapeur x 0.9863 = horse-power.  
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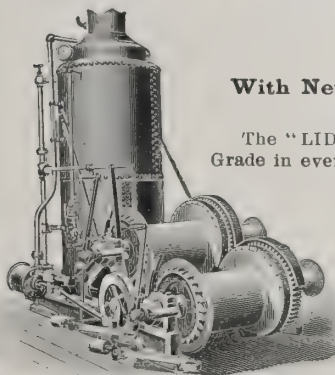
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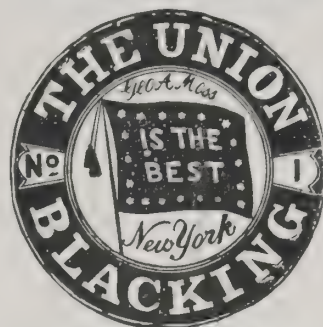


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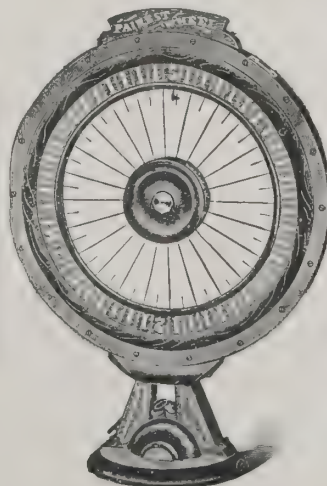
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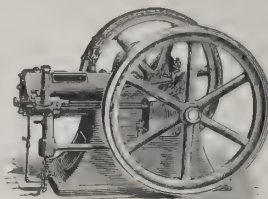
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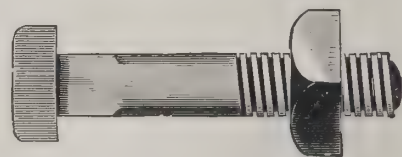
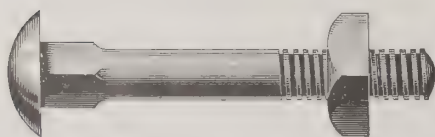
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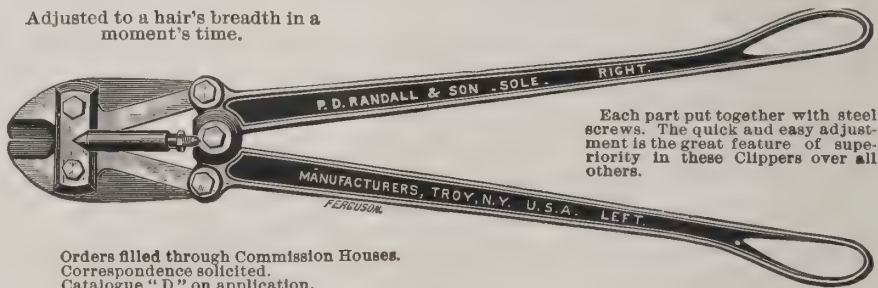
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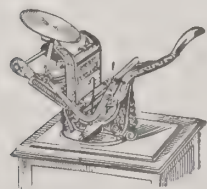
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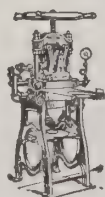
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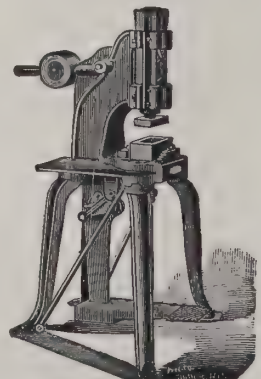
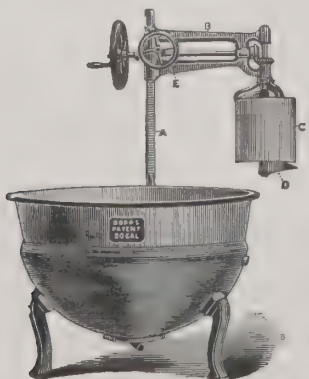
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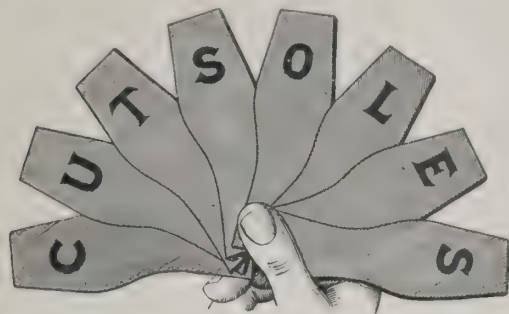
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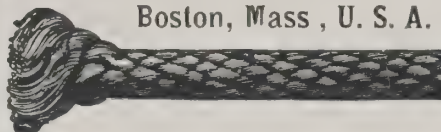
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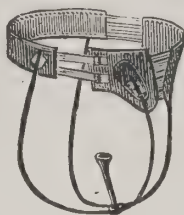
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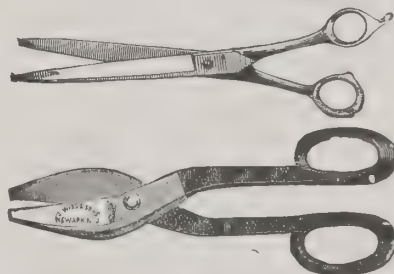
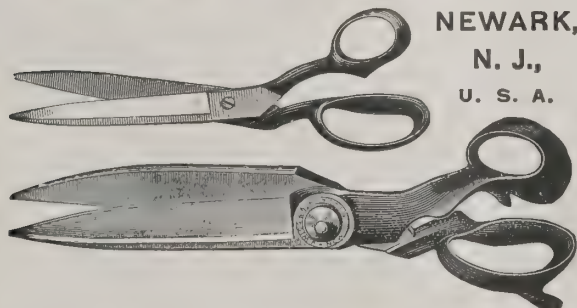
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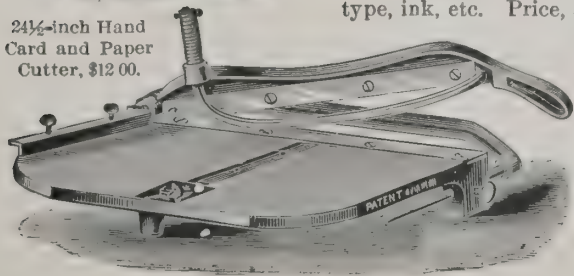
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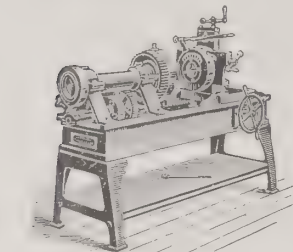
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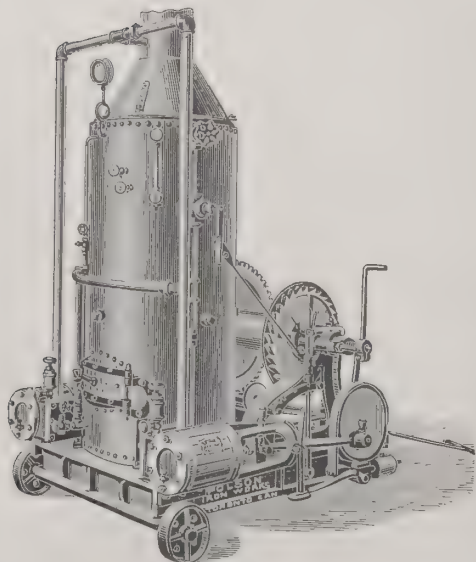
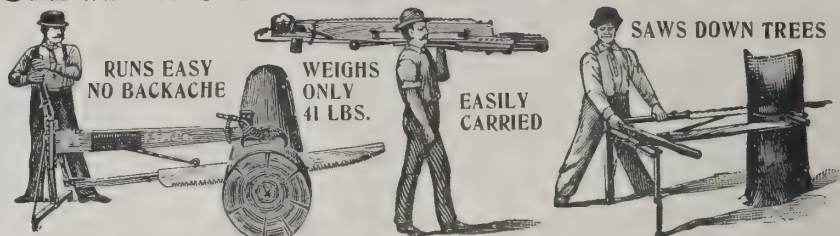
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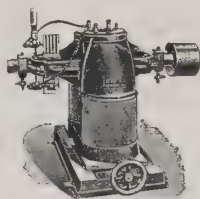
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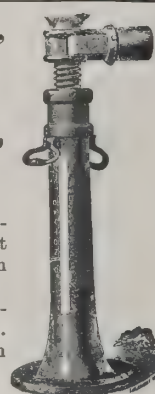
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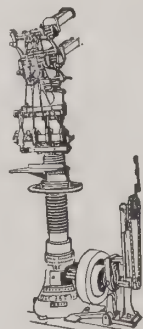
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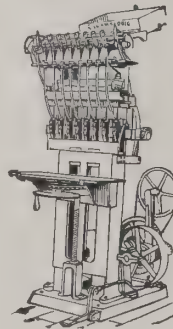
No weight or spring on treadle to tire the operator. Will nail cigar and other small boxes. Bottoms can be nailed on in two revolutions.

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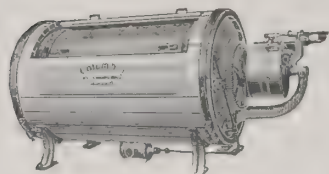






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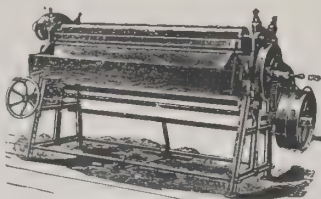
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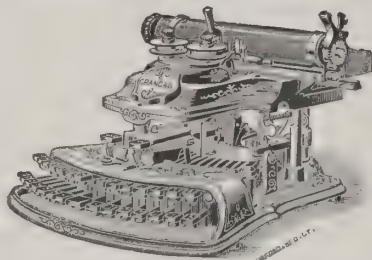
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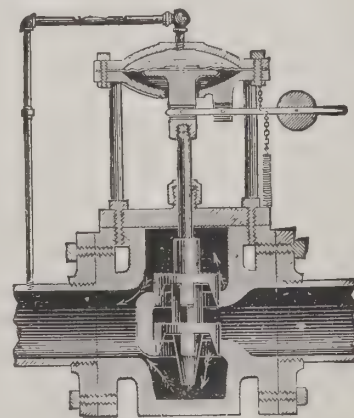
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Complete outfit, seating 56 people, with galloping horses, chariots, organ, engine and boiler, ample tent.

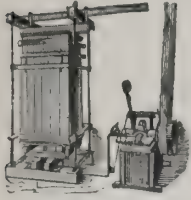
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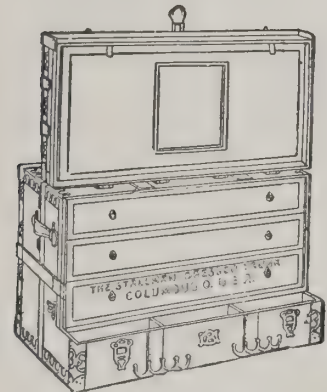
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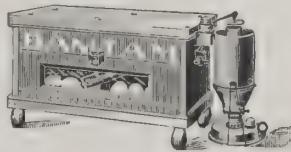
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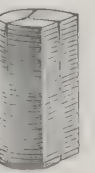
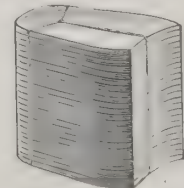
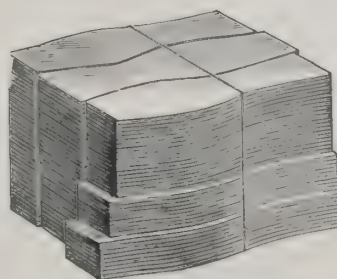
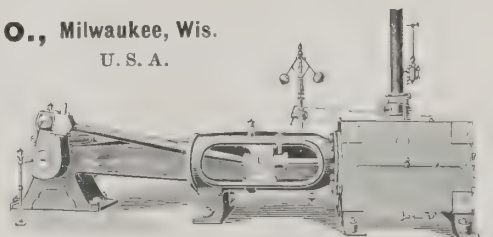
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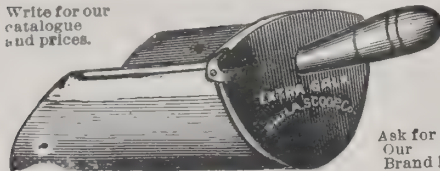
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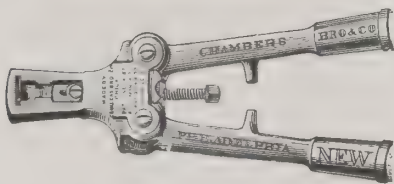
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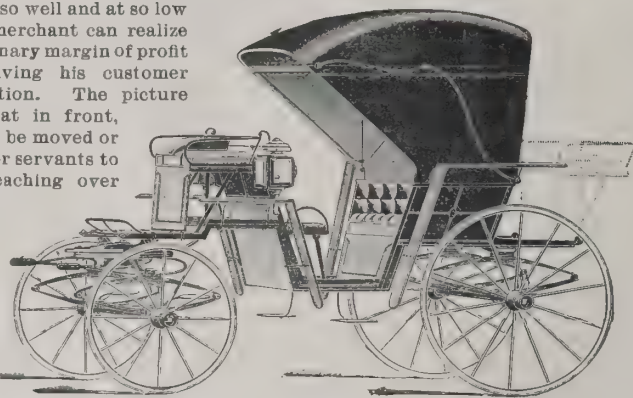
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In 1888—2235 Miles, May 1st to Jan. 1st.	1889—3605 " Jan. 1st " "	1890—3603 " " " "	1891—3603 " " " "	1892—4455 " " " "	1893—4369 " " " "	1894—4708 " " " "	1895—2344 " " " July 1st, '95.
TOTAL, 28,852 Miles.							

(This set replaced a set of Sarven Wheels that were in use one year.)  
Price of 1st Set used up in 1 year. } Which is the cheaper  
Price " 2d Set " 7 years. } In the end?  
Send for catalogue. Manufacturers Wheels, Hubs, Spokes, Felloes, Shafts and Poles.



Pat. Dec 31  
1895.

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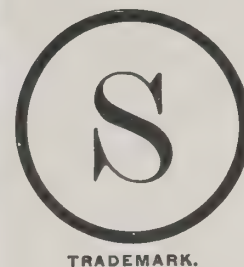
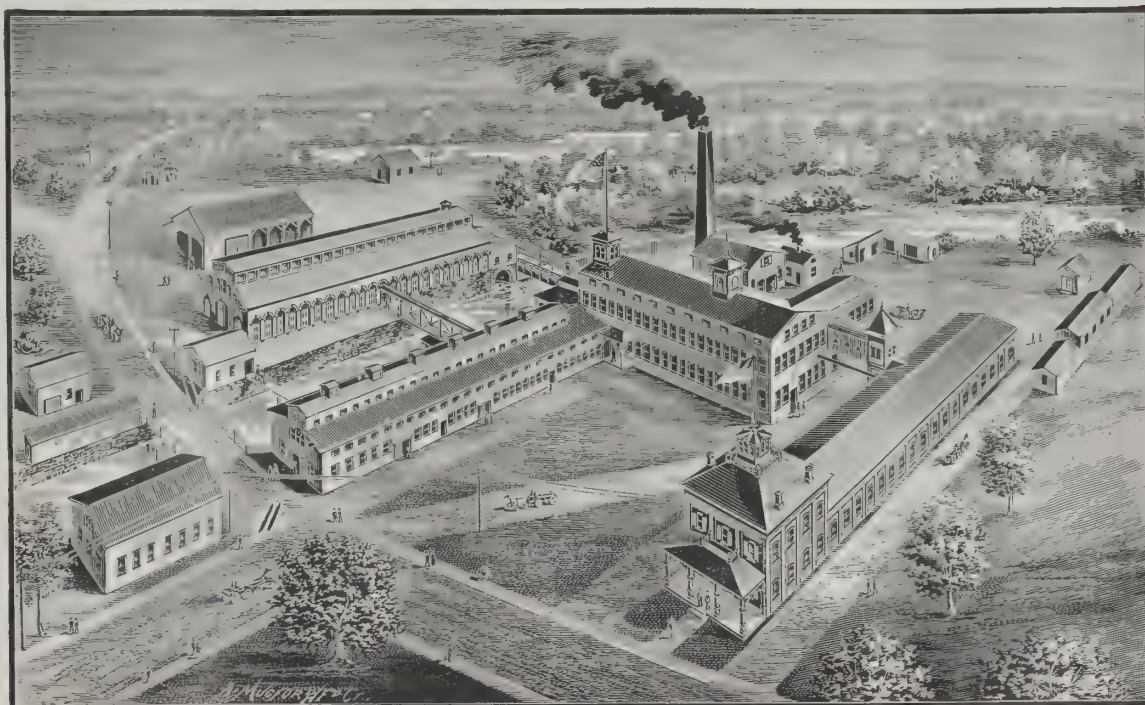


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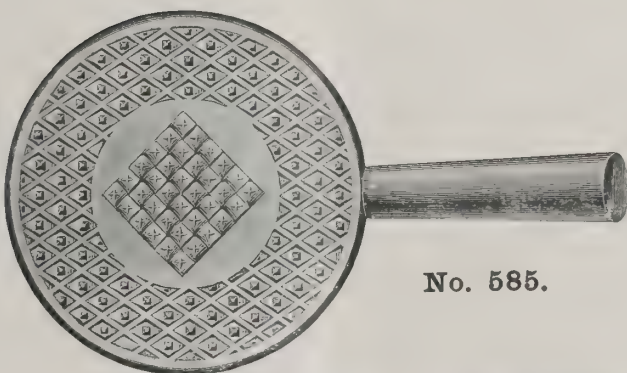
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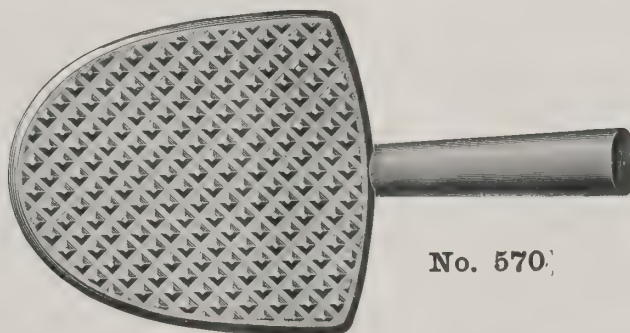
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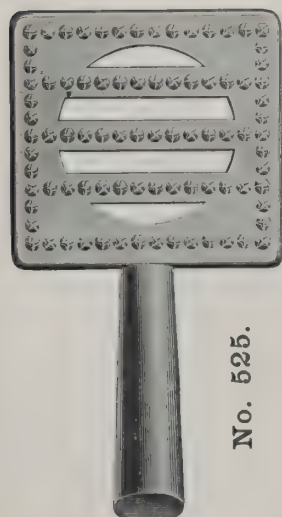
THE H. D. SMITH & CO WORKS, PLANTSVILLE, CONN., U. S. A.



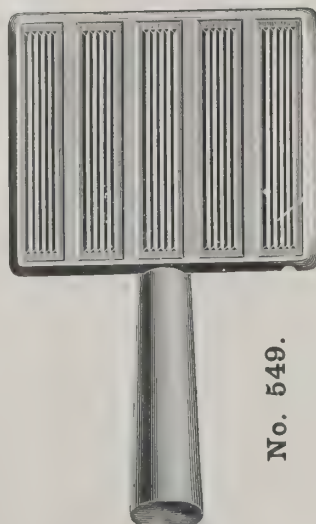
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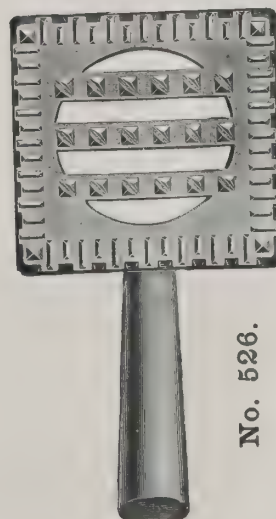
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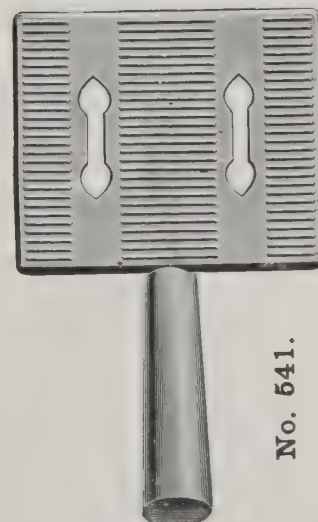
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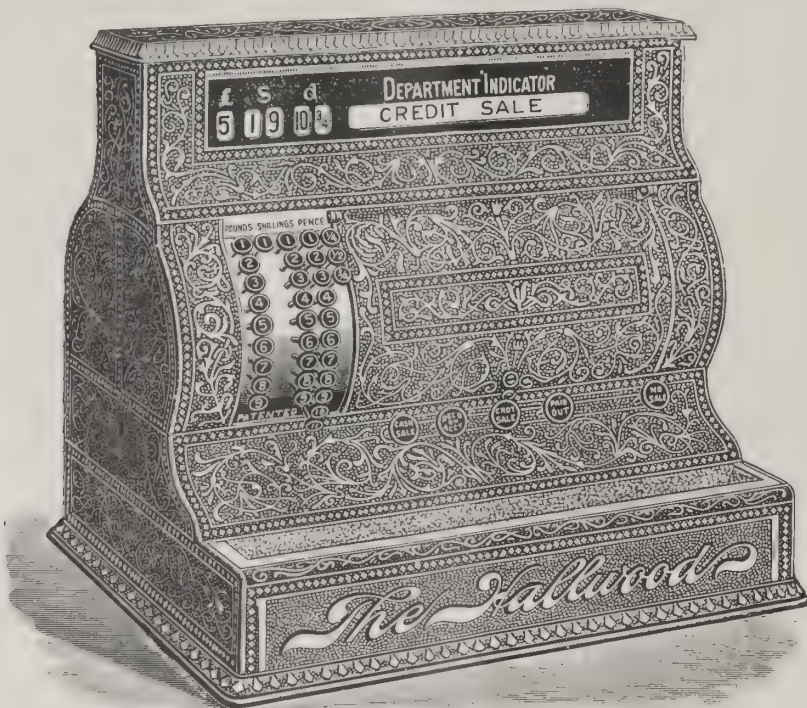
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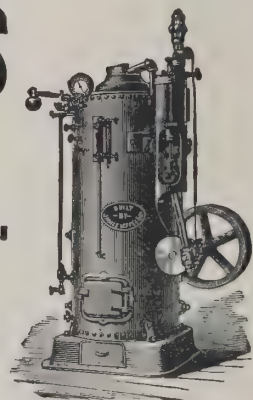
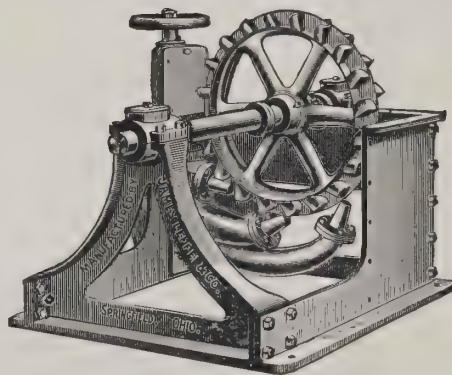
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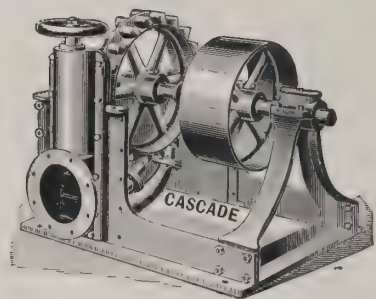
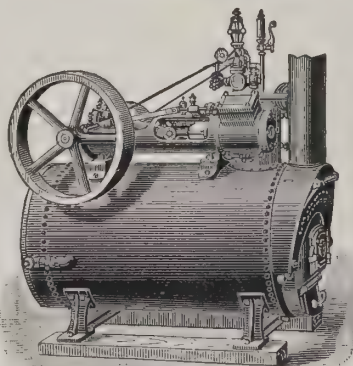
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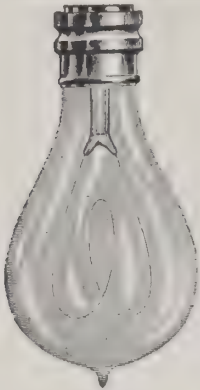
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Weight per barrel, 75 lbs.			
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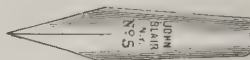


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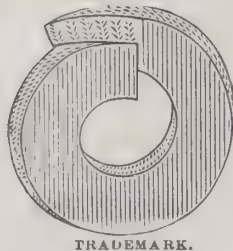


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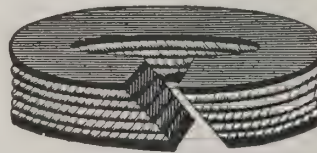
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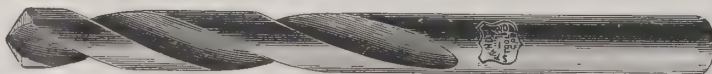


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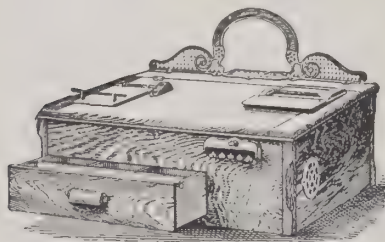
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Twist Drills made by this Company are HOT FORGED by an Entirely New Process.



They are TOUGHER and STRONGER than the OLD STYLE Milled Drills.

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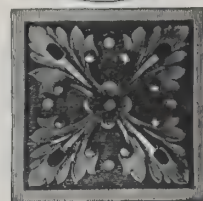
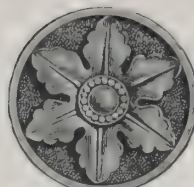
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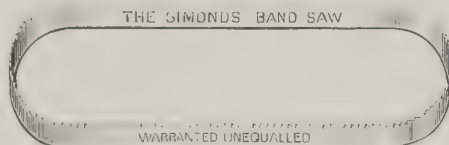
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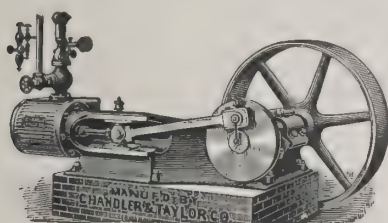
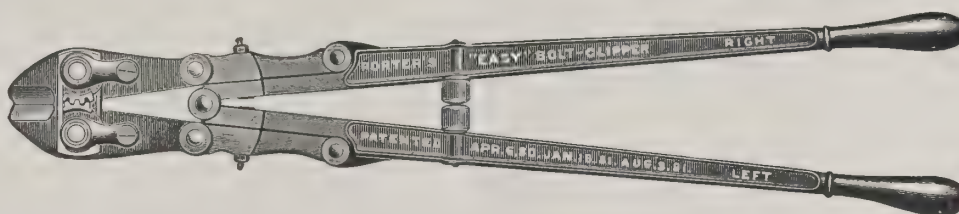
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WELL BUILT.

SERVICEABLE.

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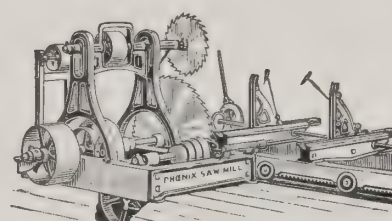
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On hand for immediate delivery.

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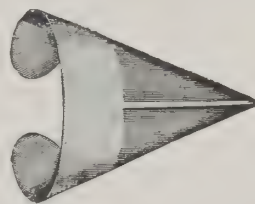


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If administered according to directions it never fails to cure. Harmless if taken internally.

THIS REMEDY IS PREVENTIVE AS WELL AS CURATIVE,

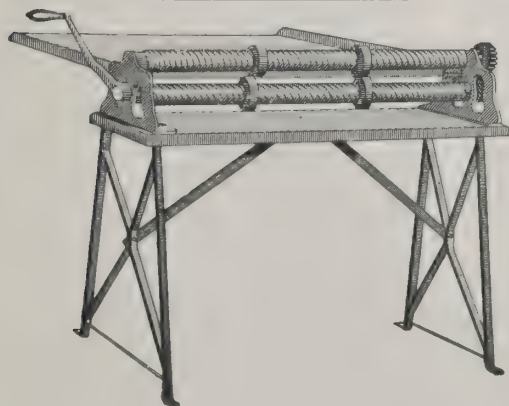
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Unfailing Certainty.

50c AND \$1.00 PER BOTTLE

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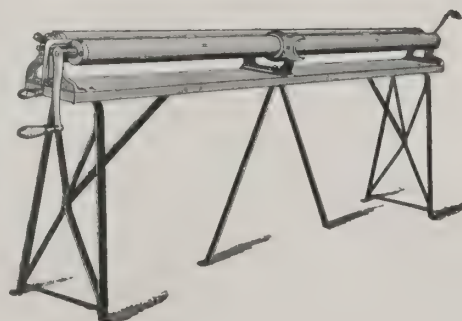
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affords the most simple, economical and efficient power for all purposes.

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Best useful effect and highest satisfaction guaranteed under all conditions of service.

PELTON WHEELS are especially adapted to

### All Spanish-American Countries

where large numbers are in use, furnishing power for

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From 25 to 50 per cent. better results assured than from Turbines or any other form of wheel.

### No Repairs Needed Even with

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WATER PIPE, TRANSMITTING MACHINERY and all appliances connected with a power plant supplied on the most reasonable terms. Shipments made from New York or San Francisco as may afford the most favorable freight rates. Catalogues furnished on application. Address, giving conditions of service,

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### PATENT LEATHER POLISH.

The only article that will produce a quick, brilliant and waterproof luster without injury to the leather. The only brilliant polish that does not crack patent leather. The professional bootblacks of the United States use far more of this article than all other makes combined, because it polishes quicker and easier, and requires less of it to do the work. The polish is also more brilliant and lasting.

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### OUR "STAR" COMBINATION



package contains a 2-oz. bottle of russet leather cleaner and a small decorated tin box of russet leather polishing paste. The cleaner removes the dirt and stains, and the paste adds a bright, durable and waterproof polish.

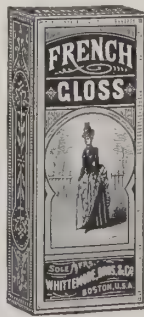
Price per gross, \$8.00; discount 10 per cent.

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in bottles without cartons and without the box of paste, price per gross, \$5.00; discount 10 per cent.

### RUSSET LEATHER POLISH

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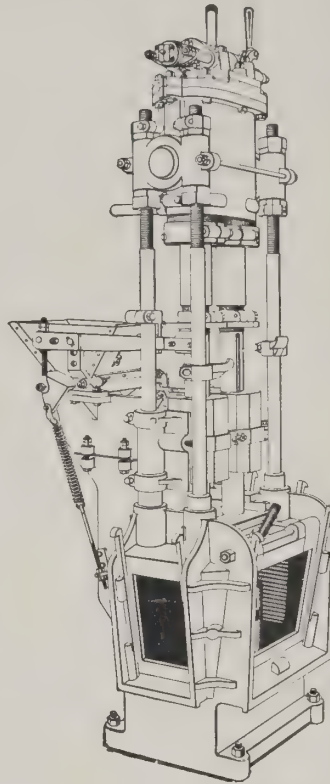
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# THE AMERICAN EXPORTER.

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## TO AMERICAN MANUFACTURERS.

THE AMERICAN EXPORTER was established in 1877 for the express purpose of developing a foreign demand for American manufactures, by calling the attention of the leading foreign importers and consumers to the unrivaled facilities in this country for supplying their wants.

It is published monthly, in separate English and Spanish editions, for dispatch direct by mail to the leading importers in every country outside of the United States.

It is absolutely free and independent of any and all other existing export agencies. Its mission is to originate trade, and not to execute orders, which is properly the function of the commission merchant.

It affords equal facilities for, and does equal justice to, all its advertisers.

It does not take goods in exchange for advertising space.

It does not employ the purchasing power of commission merchants and shippers to influence patronage.

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We desire it distinctly understood by those who contemplate advertising in THE AMERICAN EXPORTER that space for advertising purposes is sold only upon the merits of the publication for that purpose. For this reason no advertising solicitor or agency has any right or authority to agree to give reading notices or to perform any special service whatever to obtain orders for advertising.

We make it a practice not to discuss the merits or demerits of other export trade papers. Comments on their value may be made with more propriety by those advertisers who have had experience in the use of such publications.

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### DECEPTION.

COMMERCIAL ethics present the anomaly of severely condemning stealing by pilfering while condoning stealing by deception. Business losses caused by the taking of goods unlawfully are a mere bagatelle when compared with the losses caused by deception. If a manufacturer has his pocket picked of say \$100, that amount covers the entire loss, but if he is defrauded out of a profit of \$100 through the substitution of some other make of goods by a commission merchant when his own were ordered, or if goods are sold under marks or names that lead buyers to suppose they are getting his products when they are not, the \$100 loss of profit is only an initial loss which may become a continuing loss as often as the transaction can be repeated.

In dealing with a subject of this character the chief difficulty lies in the fact that manufacturers are not aware of the losses they suffer through the deceptions practiced by substituting or counterfeiting. One hundred dollars taken from a pocket is soon missed and a great outcry is raised announcing the loss and warning the public that a thief has been about. Not so with the profits pilfered by substitution or duplication. The manufacturer may never hear of the order he did not get because it was diverted from him and filled elsewhere by one of the two recognized methods of stealing by deception. We use the term "recognized methods of stealing" purposely, because if such methods were condemned by commercial usage instead of being condoned they could be suppressed more easily than stealing by pilfering has been, because evidence of the theft can be more easily secured and the punishment can be made more effectual. If the laws in all countries punished stealing by deception in the same manner as they do stealing by pilfering a mighty reform would soon be wrought in many commercial transactions. If a manufacturer, having suffered a loss of \$100 in profits through the substitution of other goods when his own were ordered, or through the sale of goods made in imitation of his own, could bring a suit against the offender for stealing and have him punished for the offence exactly as he would be if found guilty of pocket picking offences of this kind would be rare, because no business man could remain in trade with the brand of dishonesty stamped upon him by a term in prison. No matter how much dishonesty may be practiced in trade, no one advertises his dishonesty as an inducement in securing trade.

These observations have a practical basis. It is a widely known fact that German and English manufacturers are making imitations of American goods to be sold in foreign markets. They do this not only to secure trade but to secure higher prices, both the order and the price being influenced by the high reputation of American-made goods. This deception is not necessarily practiced against particular manufacturers, but against American manufacturers as a whole. Articles are marked "Made in England" or "Made in Germany" in very small letters while they are also marked in very bold letters "American Mills." This misleads the foreign buyer into believing he is getting American-made goods. Every sale of goods so marked is a specific loss for some American manufacturer and is a national loss for the whole people. While deceptions of this kind are practiced by English and German manufacturers and substitutions are made by exporting and importing commission houses in all countries, but little moral superiority can be claimed over the more open frauds practiced by the Japanese. The *Times*, of India, in a recent discussion of violations of the merchandise marks acts says the Japanese are the chief offenders. It specifies that during the last year Japanese manufacturers have openly exported into India "pencils, clocks, soaps, umbrellas and matches, all of which were fraudulently marked. 'The English pencils of the Eagle Pencil Manufacturing Company, of New York,' was the inscription on one large Japanese consignment, while an immense quantity of clocks bore the words, 'The Waterbury Clock Company, U. S. A.,' whereas all of them were made in Osaka, Japan." Imitation is said to be the highest praise, but we doubt the desirability of praise of this kind.

By authority of the common laws of all countries and international treaties of amity, if a foreigner is knocked down and robbed

in the streets of any city, the robber will be punished if caught. Why is it then that American manufacturers and the American people are permitting themselves to be robbed in this open-handed and advertised manner, and why do governments permit stealing by deception while pretending to punish stealing by pilfering?

### ARMING OUR COMPETITORS.

THE exports of a country may be divided into three classes (1) soil and water products, (2) manufactured products, and (3) machinery for the manufacture of products. Of the last class we shall now speak.

The industrial advantages of a country may be in natural resources or intelligent workmen who can devise and operate machinery by which raw materials, largely obtained from other countries, are made into manufactured products to be resold, often to the very people who originally supplied the raw material for manufacture. When a manufacturing country exports machines to be used for the manufacture of products it is in reality equipping its competitors with its own industrial weapons. A notable example of this is the building of cotton mills in India, the products of which compete with the products of English mills. On this account it not infrequently happens that manufacturers of special machinery and tools do not desire to sell duplicates to be used in their own or other countries. They prefer to keep the machines and operate them for their own benefit, selling only the products of the machines. It is being observed, however, that the industrial advantage of intelligent workmen is more permanent than that of natural resources.

Exportations of raw materials, or what we prefer to term unfinished products, are so many confessions that the ability to manufacture them into finished products on terms of economic advantage is not possessed by the country of their origin. The ability to manufacture properly and cheaply is the master of the ability to supply unfinished products and will draw them to itself from all quarters of the world, thus compelling the consumers of finished products to pay the wages of its intelligent workmen. Of this ability England furnishes an example to the world.

The wages of labor are invariably lower in localities that supply unfinished products than in localities that supply only finished commodities. The manufacturing arts require the highest degree of intelligence, and such intelligence commands the highest wages. It is sometimes said that a machine must turn out its products at the same rate regardless of the intelligence of the workmen that operate it. This may be true of some classes of machines, but it is not true of all machines. In fact, it is well known that there are many American-made machines highly complicated, requiring such skillful handling that good results are never obtained from them unless they are operated by specially instructed and skillful workmen. It is not unusual to find buyers terribly disappointed with such machines simply because the workmen they employ are not competent to operate them properly or to their full capacity. In fact, sagacious employers, when these machines are used in home factories, encourage workmen of the better class by liberality in the wage scale, to the most efficient use of the most perfect machinery, so that there is a large increase in output, meaning increased wages for the workmen coincidentally with a decrease in the cost of production. This is the American policy in the employment of labor. High wages and the use in connection therewith of labor-performing machinery and labor-saving tools are the real secrets of cheapness in production. Cheapness in production decides who shall be master in competition.

While American manufacturers of machinery are now equipping manufacturers in all parts of the world with the means of competing with American manufacturers of finished products, unless these machines are used as skillfully as they are at home they will be like a good rifle in the hands of an unskillful marksman: they will not enable the foreign manufacturer to hit the mark of lowest cost of production. One example will serve: Typesetting machines, manufactured by the Linotype Company, are expensive machines, of which labor counts for 90 per cent. of cost. These



machines being made with substantially the same machinery in Germany and in the United States it has been found that the American-made machines cost less than those made in Germany, although labor in Germany is 40 per cent. cheaper than in America. The American policy of employing labor has resulted in watch-making and cycle building in the highest efficiency attained with the lowest cost of production.

In every class of American manufactured exports the wages recovered from the sales are higher in rate per day and in purchasing power than in any of the countries to which these goods are sent.

We can arm our competitors with our tools and machines, but the results they obtain from them are dependent upon the skill and energy with which they are used.

### ELECTRIC MOTOR POWER.

THE progress made in developing and applying electric motor power in the past few years is the most wonderful phenomenon ever witnessed in the industrial arts. Writing upon this subject in 1889 we said: "Did civilization advance when a machine gave partial liberty to the slave who sang the 'Song of the Shirt'? How much more shall civilization advance when that same slave gains the greater liberty of having light with which to see to work, and of having the mechanical force required to operate that same machine come to her in an electric current through a small, flexible wire?"

"A new acquisition of the use of mechanical power has always marked an advance in civilization. The degree of advance made is always limited by the power to produce and distribute the new force cheaply. What limits may be found on the practical distribution of electric power is not known. Conditions for its distribution are being learned. When the natural laws governing it are complied with in these conditions it is known that the world is not large enough to limit its distribution. This means that instead of having a large number of comparatively small steam plants scattered over a city, each costing a considerable investment; each attended with its expense for water, fuel and other material; also for its fireman and engineer; each with its attendant noise, smoke, dust, dirt and rubbish; each with risk of injury or loss to property or life by fire or explosion—instead of all these centres of disturbances, smutch or danger there will be but one, and that one removed from the central part of the city. From one station power can be delivered to operate all the machines for all mechanical works and to operate all the street cars in the city. To accomplish this two systems can be used—one using large motors to operate all the machines in a shop from lines of shafting, exactly as a steam engine is used; the other is to connect each machine to a small motor of sufficient capacity to operate that machine only. By the latter system all lost motion in shafting and all loss of power caused by having a machine run when not in actual use would be overcome."

At the time this was written there were no practical examples of machine shops operated exclusively by electric motor power. The progress since made in the directions then indicated is well illustrated by an equipment now being installed by the General Electric Company, of Schenectady, N. Y., U. S. A., in the new factory of the Keating Wheel Company, of Middletown, Conn., U. S. A.

This factory is divided into three buildings of brick and stone. The main building is 1,000 feet long, 50 feet wide and two stories high. Projecting from this are six L's, each of which is devoted to some special operation on the wheel. The floor space of the factory and office is 168,250 square feet.

The unique feature of this factory lies in the fact that it will be entirely operated by electricity, not an engine or main belt coming into the factory proper. The system chosen is the three phase, which is now in use in a large majority of power transmission and distribution plants in the United States. The engine and generating plant is located some distance from the factory. The generator is known as an A-T 16-pole, 250-kilowatt, 450-revolution, 60 cycle machine. The exciter for the generator is a 4 1-2-kilowatt machine of the L. B. type. The switchboard is of Vermont marble, on which

is placed packed card rheostats, current indicators, volt meters and the necessary switches for controlling the exciter and the generator. From the switchboard six wires, forming two circuits, lead from the power-house to the factory. The service circuit wire follows the centre of the roof for about three-fourths of the length of the whole building. At the proper places they are tapped off, descending their respective pillars to motors suspended from the ceiling of the first story. The shafting in the main building is about 800 feet long, divided into three sections, between each of which is a 50-horse-power induction motor of the inverted type. There are other short lines of shafting in the L's from 300 to 350 feet long driven by 20-horse-power motors suspended from the ceiling. All the motors are equipped with two pulleys on each end, so that four independent shafts can be driven from each motor.

It is intended to make this one of the most complete cycle factories in the world. Nothing has been left to chance. It is the outcome of two years' close study and is a notable specimen of the application of electric motor power to manufacturing purposes. The progress made since 1889 in this direction, remarkable as it is, is only sufficient to furnish a basis and give momentum to the progress that is to come in the not far off future.

### A GERMAN STUDY OF AMERICAN RAILROADS.

A YEAR or two ago German Imperial Commissioners were sent to the United States to study and report upon American railroads. Their report has just been published. It gives evidence of the methodical and careful work for which Germans are becoming so famous. The commissioners visited every part of the United States, travelling 8,079 miles.

They pronounce the New York Central and Hudson River Railroad as one of the best roads in the world. Its express trains from New York to Chicago cover a distance of 969 miles in 20 hours, an average of 48 1-2 miles per hour. Comparing this with European roads it is shown that the distance from Leipsic to Rome, 945 miles, requires 35 hours, an average of 27 miles per hour; Ostend to Vienna express, 821 miles, 23 to 25 hours, average 35.3 miles per hour; Paris to Constantinople, 1,892 miles, 65.4 hours, average 29 miles per hour; Ostend to Edytkuhnen, 1,045 miles, 27.1 hours, average 38 1-2 miles per hour; Paris to Lisbon, 1,175 miles, 39.51 hours, average 29.7 miles per hour; Calais to Brindisi, 1,380 miles, 40.35 hours, average 34 miles per hour; Paris to Nice, 676 miles, 17.3 hours, average 39 miles per hour; Ostend to Constance, 1,673.6 miles, 52.3 hours, average, 32 miles per hour. The European trains taken for these comparisons are those that save time by using the Belgian system of through sleeping cars and avoid delays from changes of all kinds. They are the fastest trains in Europe. The ordinary international trains are much slower than these. The so-called fast trains from Berlin to Madrid, 1,573 miles, 56 hours, average 28 miles per hour; Berlin to Rome, 1,555 miles, 38.14 hours, average 27.6 miles per hour. The time saved by American travellers, indicated by these figures, is an enormous national gain.

The difference in speed attained by American over German trains is all attributed to the limited capacity of Continental, especially the German, locomotives. The commissioners lay considerable stress upon this fact. They also point out the fact that it is the practice on American roads to use locomotives up to their full capacity and then put them aside for new ones, thus making way for all of the best features of progress.

After speed, the lack of comfort is the most noticed difference between American and European railroads. Germany, like all Continental countries, has built its cars on England's model of an antediluvian stage coach. These swinging boxes, rattling from side to side, are the horror of English and Continental travel. In the United States such cars are unknown. American day coaches are models of comfort, easy riding and convenience, and the sleeping cars and system are vastly superior to those in use in Europe. In America a double bed costs \$1.50. In Europe there are no such conveniences, and a single bed costs \$2.15.

The American baggage system is pronounced infinitely better



than the European. Americans send 150 pounds of baggage free. In Europe only 55 pounds are free, and then only on certain tickets. The American brass-check system receives high praise in comparison with the red tape run off in Europe before baggage is "checked."

The American system of selling accident-insurance tickets at stations, furnishing free time-tables, bureaus of information and selling newspapers, fruits, candies and luncheons is fully and approvingly described.

The difference in the ways trains are lighted is most marked. In America nothing is left to be desired in this important essential, many of the trains being lighted by electricity, while in Europe the trains are most wretchedly lighted.

In Prussia the cost of passenger travel is given at 2.14 cents first class, 1.59 cents second class and 1.11 cents third class per kilometer, and in the United States at 1.34 cents per kilometer (1.611 miles). This shows railroad fares in the United States to be astonishingly cheap, when speed of trains, comforts, baggage privileges and the many accommodations and facilities furnished at stations without charge are fully and fairly considered.

Such information as this, and from such a source, laid before railroad builders and operating companies in all parts of the world can but serve to turn their attention to America for their locomotives, cars and general equipments.

#### A DEEP-SEA TELEPHONE.

THE dangers and disadvantages under which divers make explorations and execute work under water, sometimes at great depths, can very readily be imagined by those who have not experienced them. Any contrivance that will lessen the first and reduce the second will be instantly recognized as of great value. To this end facilities for quick and reliable communication between the diver under water and his attendants on the surface are of supreme importance.

Captain Lewis Sorcho, of Baltimore, Md., U. S. A., a submarine diver of long experience, has perfected, after a long series of expensive experiments, a deep-sea telephone for the use of divers, from the use of which great benefits are derivable both for the safety and comfort of the diver and for the efficiency of his work. For the purposes of his experiments he had a huge tank constructed with an immense glass front; it contained 80,000 gallons of water. He had two assistants, one of whom was his wife. One of the assistants would spend hours under water, while the captain remained on the surface making alterations or improvements in the telephone or its apparatus. Occasionally the captain would go below in order to test the diver's end of the outfit. After months of tireless exertion he has perfected a deep-sea telephone apparatus that is practical, simple, strong and highly effective. By its use an attendant on the surface can hear almost a whisper from the diver, and vice versa.

The apparatus consists of a headgear for both diver and attendant made of elastic rubber. It fits over the top of the head and under the chin. Over the left ear is a transmitter, and over the right a wooden pad, which shuts all sounds out of the ear and prevents pain in the ear from pressure. A submarine waterproof cable passes through the front of the helmet by means of a stuffing box. The arrangement is such that the attendant has the free use of his hands, which is very important in handling the line connected with the diver. The cable runs from the lower end of a brass strip, where there are also connections for the wires that lead to the batteries. Of these there are from eight to twenty-four used, according to the depth at which the diver is working. They are dry batteries, incased in a neat wooden chest handy for carrying in a boat or moving about wherever needed. The receivers and transmitters look a good deal like the ordinary long-distance telephone, only that they are flat and about the circumference of a silver dollar.

To be able to talk to a man away down in the ocean's depths is truly novel, and to hear him talking and telling of the strange sensations he is enduring and the sights he is seeing and to be able to

get an accurate account of just what he is doing is interesting and still more advantageous. The dangers which beset the diver will be greatly reduced, for the reason that if anything happens to him, such as a beam falling on his lines, thus making him a prisoner at the bottom of the sea, he can give an accurate account of it and another diver can be sent down to release him. He can also order anything he may need sent down to him, and can, by a simple wire connection made on the surface by two attendants, even talk to another diver who may be working some distance away from him. The telephone is always ready for instant use. There is no calling up to be done. In case of an accident a diver can instantly call upon his attendant to haul him up. These and many other advantages will greatly lessen the dangers and decrease the disadvantages which have heretofore been inseparable from submarine work.

#### AN IMPORTANT NEW AMERICAN ELECTRICAL INVENTION.

IT not infrequently occurs that inventions, in themselves very simple, accomplish results of the highest importance to society, industry and commerce. Such inventions are, proportionate to their benefits, and justly so, most reliable earners of dividends upon the capitalizations employed in exploiting them, and making their services available for those to whom they may bring benefits. A most notable invention of this class is the telephone; at first a toy, now it is a leading commercial interest, performing services of incalculable benefits to society, industry and commerce.

During the past three or four years interested parties have been developing a system for the automatic electrical transmission of heat and fire alarms that bids fair to become of the highest importance, regarded as a protection to business and property from loss by fire, and, as a logical sequence, as a good investment for the capital employed in exploiting it.

The thermostat of this system is constructed on the well-known principles of a mercury thermometer. It can be set to give an alarm at any desired degree from zero up. It is placed in circuit with annunciators, alarm bells, a testing and recording apparatus, and primary batteries that supply the electric current. The expansion of the mercury by heat causes it to rise in a tube and close the circuit by making contact with one branch of the circuit, the other branch being connected with the bulb of mercury at the bottom of the thermostat. The closing of the circuit causes the alarm bells to ring, calling attention to the presence of undue heat where the thermostat is located and the annunciator drops to show its exact locality. This simple statement will enable any person to understand that if the electrical current and connections are in perfect condition this thermostat is certain to give an alarm on the occurrence of overheating from any cause, as the expansion of mercury by heat is as certain as the action of the natural law of gravitation. It is also clear, as soon as the cause of overheating has been removed, that the mercury will contract, thus opening the circuit and stop the ringing of the bells. It cannot act in any other way, therefore the bells will ring when once started until the cause of the alarm has been discovered and removed.

The chiefs of fire departments and all underwriters, in fact every person who has experience with or observation of the causes and methods of protection against losses by fires, know the supreme importance of an early alarm. The first moment is frequently worth more than the next hour. One person at the right spot at the right time may do better service than the entire fire brigade of a city a few minutes later. The value of a device that can be relied upon to give notice of overheating on the instant the predetermined degree is reached without the intervention of any human agency, and will not do it under any other circumstances, is too apparent to require demonstration. An equal degree of certainty is required in the system through which it operates. This is provided for by a testing and recording apparatus, by means of which the condition of the batteries and all electrical connections can be tested at will and a record of the test made showing when it was made and that the entire system was at the time in



proper working condition. The record of the test will not be made if the batteries are out of order or if any electrical connection is broken. This test safeguards the business, the property owners, and the insurance companies.

The application of this system is no longer a subject of theory or doubt. It is now installed for practical use in some of the most important manufacturing plants in the United States and is in use in all United States battle ships, cruisers and gunboats finished and equipped during the past two years. It has been inspected, tested and approved by the National Board of Fire Underwriters, the New England Insurance Exchange, and the Boston Board of Fire Underwriters. These boards allow a reduction in insurance rates for property protected by this automatic system, and accept the services of this system in lieu of the services of a watchman wherever their rules require the employment of a watchman for fire protection. Buildings are now being equipped with this system and rules made prohibiting watchmen from entering the building except in response to a call from the automatic alarm. In several cities connections are made with the city fire alarm system in a way to cause the street box to be pulled and the alarm to be sent into the fire department direct from the thermostat, without the intervention of any human agency. This gives the fire department instantaneous notice of overheating in any room in any building equipped with the system. It practically extends the city system into every room, and can place a tireless, sleepless watchman on duty for every twelve square feet of room space in a city. For isolated buildings connections can be made from one to another so that a fire starting in a country house would not only alarm the occupants of the house but of one or two neighboring houses as well, thus bringing immediate assistance. A fire in a factory would call the volunteer fire department of the village, and the superintendent and employees living near it.

Important special uses for the device are being found, such as giving notice of the overheating of the journal bearings of fast-running machinery, thus avoiding expensive delays from shut downs to cool the bearings, repairs of damages caused by overheating and all risk of fires from such causes; the detection of heat in coal bunkers that would develop spontaneous combustion; the overheating of grain in elevators and a rise of heat above the temperature desired in cold-storage rooms, drying rooms, dry kilns, etc. It is also a valuable supplement for automatic-sprinkler systems, as the thermostat can be set to give an alarm at a degree of heat that would be dangerous but not sufficient to cause the sprinkler head to open, thus directing attention to the spot and enabling persons to find and remove the cause of the alarm before the sprinkler head can open. An immense water damage is saved in this way.

Every one of these statements has been fully verified by practical experience. In 1893 there was a fire in the Pullman Palace Car Company's Works at Pullman, near Chicago, Ill., U. S. A., that cost \$320,000. Since then fourteen of their buildings have been equipped with this system. Another fire started in a similar way, but on account of the prompt alarm the loss was but a few dollars. In several instances alarms have been given calling the city fire department and others so promptly they have been able to remove the cause, thus stopping the fire before the sprinklers opened. At St. Paul, Minn., spontaneous combustion occurred in an oil room where twenty-two barrels of oil are tapped and used every day. An alarm was instantly given and responded to. Two dollars and a half paid for the damage. The firemen report that had there been a delay of 5 minutes it would have been impossible to save the building. In June, 1896, spontaneous combustion occurred in a coal bunker on the United States battleship Indiana. An alarm was given by the thermostat buried in the coal, the bunker was immediately served with water and steam and no damage was done. In March, 1897, a similar occurrence on the United States cruiser New York took place with the difference that the thermostat, of a different make, did not give the alarm. The fire was discovered only when smoke issued from smouldering woodwork, and the utmost promptness, skill and courage were required to avert the horrible disaster that would have been caused by the explosion of the powder magazine.

With a large number of equipments in factories, mercantile houses, naval ships connected directly into the fire-alarm systems of many towns, and exposed to all conceivable conditions of usage, the record of this system up to date is that it has never failed to give an alarm when conditions required it. No property equipped by this system has been lost by a fire occurring on the premises, and it has saved many lives and millions of dollars' worth of property with an actual loss for repairs of less than \$100.

Such a record is sufficient to establish the value of this system and the devices it employs.

#### BOUND TO HAVE SECOND BEST.

MODERN ideas of progress require that everything purchased shall be of the best up to date. When this rule is not lived up to by any person or corporation we are likely to expect a Chinese name to accompany the announcement. The London County Council, however, has recently furnished an exhibition of the unprogressive in government by declining to accept bids from American firms to furnish steam fire engines for the use of the city. It is reported that a proposal that American bids should be invited "was received by the Council with a howl of disapproval." Yet competent judges state that American engines and their equipment are far superior to those made in England.

If the London County Council will have second-best engines there is no law to prevent them from doing so, but this is an odd example for a manufacturing nation to set before the world. England's motto is supposed to be, Free trade, and may the best man win.

#### THE GOLD FIELDS IN GEORGIA, U. S. A.

GOLD mining is rapidly passing from a speculative to an industrial enterprise. By the use of modern science and machinery it is as possible to tell how much gold can be taken from a ton of "pay dirt" as to tell how much lumber can be cut per acre of forest. The use of machinery and engineering and chemical skill makes gold mining in a sense a manufacturing industry, from which nearly every factor of chance has been eliminated.

Before the discovery of the California gold fields working for gold was quite common in North Carolina and Georgia. At one time the yield, obtained by the crude methods of those days, was so encouraging it led to an agitation for a larger use of gold, similar to recent demands for a larger use of silver, and for the same reasons. This resulted in a change in the coinage laws of the United States in 1834 reducing the weight of gold coins, changing the ratio from 15 to 1 to 16 to 1, so that 94 cents' worth of gold, measured by silver, should pass for \$1. This put the United States on a gold basis, where it has since remained.

The prospects of winning hidden wealth in the new gold fields of California during the memorable period of "'49" were so alluring that all experienced miners were attracted to the West, leaving the Southern fields abandoned. They have been neglected so long that the calling attention to them now is almost equivalent to a new discovery. Fields rich enough to cause a change from a silver to a gold standard because of their yield, actual and prospective, when worked by the unscientific methods and appliances of 1834 cannot fail to yield good profits to the application of modern methods. In these fields cotton mills are being erected employing large investments of capital for the sake of an expected manufacturers' profit. With less uncertainty and with better profits in prospect capital can be employed in reworking these gold fields, and many mining experts are now turning their attention to them.

The tremendous drop in South African mining shares is rapidly turning attention from those fields. From October, 1895, to October, 1896, these shares dropped, on the average, 43 per cent. Notwithstanding this enormous depreciation the London *Statist*, in making up the price of shares of eighty-three properties, February 22, 1897, shows a further fall since October, 1896, of 27 per cent., aggregating a loss in market value of \$125,000,000. Facts such as these



must inevitably turn the attention of mining engineers and the capital they can influence to the less speculative but more productive field of the Southern American States, where, surrounded by all the advantages of a civilized community, gold mining can be made an industry.

#### SUCCESSFUL LONG-DISTANCE TRANSMISSION OF ELECTRIC POWER.

THE successful operation of the long-distance transmission plant installed for the San Joaquin Electric Company, Fresno, Cal., is an illustration of the great industrial evolution now being entered upon. Power generated by water is transmitted a distance of 35 miles. At this distance from the source of power there are operated 145 arc lamps for street lighting; 5,000 incandescent lamps for interior lighting; 410 horse-power in motors for miscellaneous work; 180 horse-power in motors for operating a flour mill, and 75 horse-power in motors for operating the city pumping plant. All of this machinery has been operated with perfect success from the start.

Water powers are scattered all over the world that may be utilized in a similar way. It is difficult to see what changes such distributions and subdivisions of power will induce in the world of industry.

#### PRESIDENT MCKINLEY'S MESSAGE OF PEACE TO THE WORLD.

IN his inaugural address the recently elected President of the United States, William McKinley, announced the policy of his administration in the following message of peace to the world:

"We want no wars of conquest, we must avoid the temptation of territorial aggression. War should never be entered upon until every agency of peace has failed; peace is preferable to war in almost every contingency. Arbitration is the true method of settlement for international as well as local or individual differences."

This is the expression of a man who enjoys the proud distinction of having once served as a private volunteer soldier in the ranks during the war for the preservation of the Union, and now he is Commander-in-Chief of the Army and Navy of the United States, by virtue of the office of President to which he was elected by the votes of 7,100,000 sovereign citizens.

#### LORD SALISBURY'S MESSAGE OF PEACE TO THE WORLD.

LORD SALISBURY addressed the Associated Chambers of Commerce of England, at a banquet held in London, March 11, 1897, as follows:

"It must be remembered that the British Government could not be guided in their policy by personal sympathies or religious proclivities and sentiments. They were the trustees of a great nation's interests and obligations, which they were bound to maintain above everything else. If they manfully did their duty under the circumstances it would promote, as no other course of conduct could do, freedom and justice, and, above all, European peace, upon which all commerce, industry and well-being depends."

Correct moral and economic laws are one and indivisible. Each completes and contains the other. "Freedom and justice, and above all peace, upon which all commerce, industry and well-being depends," are founded upon moral and economic laws by which the policy of every nation must be guided if it would hold its rank in the progress of civilization.

#### NEW ART IN COPPER CASTING.

A NEW discovery in the art of copper casting has been announced. It is stated that by the new process the metal is cast without alloys. This has heretofore been considered an impossibility. It is claimed that the new metal possesses an additional tensile strength of 33 1-3 per cent., a much higher percentage of elasticity, and that its electrical conductivity is 95 per cent. compared with the best rolled copper. It is expected this new copper

will cause distinct changes in the construction of dynamos, motors, electric railway apparatus, etc., because it will carry the same current formerly provided for with one-third of the metal. Wire made out of this metal will have greater strength and conductivity than the wire now in use. This is a matter of high importance to every one interested in electrical equipments.

THE GOLD STANDARD IN JAPAN.—The House of Representatives of Japan passed a bill, March 12, 1897, establishing a gold standard for that empire.

#### America Can Defy German Goods.

(By Our Special London Correspondent.)

LONDON, March 1, 1897.

WE have heard a great deal during the past year about German competition with Great Britain and how German-made goods are driving those from England out of the world's markets. Now, this journal is not directly concerned with the contest between the Briton and the Teuton so long as the battle does not affect American interests. But the question will eventually arise whether a struggle will not ensue between the United States and Germany for the possession of the import trade of several countries, and it is well to be prepared for it. I am not, of course, referring to the usual competition which is always going on between rivals, but to the same sort of "dead set" which Germany is now making against English manufactures everywhere.

Now, I want to point out to foreign buyers that in the elements which go to make up cheap production the United States are far beyond Germany. Of course America does not do anything of an export trade in pig iron, at least not yet; but she does a very big business in exporting metal goods, hardware, etc., and the questions of cheap production of raw materials and then a low cost of manufacturing therefrom enter very largely into the problem whether American exporters can supply foreign buyers in competition with Germany. Well, it may safely be said that the productive power of most of the American furnaces largely exceeds those of Germany. The United States have also cheaper coal than Germany, and the importance of a cheap supply of fuel cannot be overestimated when dealing with any large productive industry.

The author of the celebrated book, "Made in Germany," refers to the growing competition between American and European manufacturers and notes how well the exporters of the United States are able to hold their own (and very often a good deal more) in Europe. In speaking of the presence of American goods in the British market he adds: "I note this fact in passing, for the purpose of reminding my readers how vital is the necessity of making a stand against the still more insidious and deadly practice of the German." Germany has gone in largely for technical and scientific education. Well, the United States are fully abreast of the Teuton in that respect and are not likely to recede from that position. Nowhere in the world are the operatives so smart, so intelligent, so "brainy"; they all know "the whys and the wherefores," and understand the object of their work instead of giving merely mechanical assistance. This makes them so prolific in invention, a feature which will always enable them to defy the Germans, who generally lack this quality and become mere imitators. Another fact is that American manufactured exports have been increasing more rapidly than those of any other country.

One of the chief reasons for this progress is the American superiority of machine over hand labor. They don't use their hands in the States so much as they do their brains, and that stands for labor saving machinery, which, in its turn, means cheapening of production. The Germans are adept in copying; the Americans are quick to invent and to drop all obsolete methods. They will take up a thing, although it is considered to be a novelty, and see what it is worth. This "open-mindedness," as I may call it, has caused the whole world to regard America as the place to look for all that is new, progressive and go-ahead. They anticipate instead of following. All foreign buyers who have had anything to do with Germany and the United States know this to be true. Looking at the matter from all standpoints I do not at all think America has much to fear from Germany or from the policy of "cheap and nasty" imitation.

#### Cost of Telegraphing Abroad.

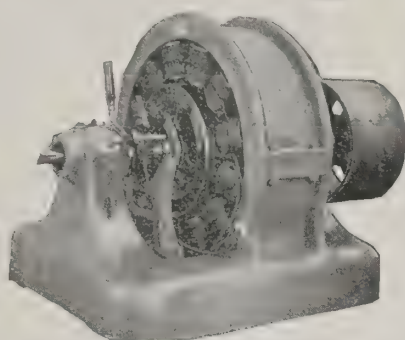
CABLE messages from a central point in the United States to England and France cost 31 cents per word; to Belgium, 36 cents; to Holland and Italy, 38 cents; to Austria, 40 cents; to Greece, 44 cents; to Egypt, 62 cents; to Russia, 49 cents. The Cuban war has multiplied many times the volume of telegraphic business in the West Indies. The lowest rate is 40 cents a word for messages to Havana. No town in the West Indies outside of Cuba can be reached for less than \$1.05 per word. To cable to Porto Rico costs \$1.85 per word. Messages to Brazil cost from \$1.35 to \$1.87 per word; to British Guiana, \$2.17; to China, \$2.02; to Japan, \$2.27; to India, \$1.29; to the Philippine Islands, \$2.51; to Siam, \$1.41. It costs \$2.62 a word to cable to Queensland, and, highest figures of all, \$3.02 to cable a word to Mossamedes in Africa.

—The largest cargo ever taken out of the port of New York was shipped lately in the new twin-screw steamship *Pennsylvania* of the Hamburg-American line to Hamburg. It consisted of 18,500 tons of freight, or enough to fill about 516 freight cars.



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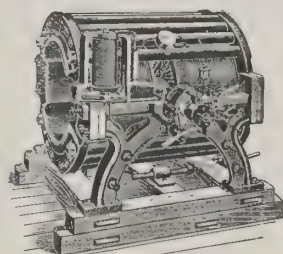
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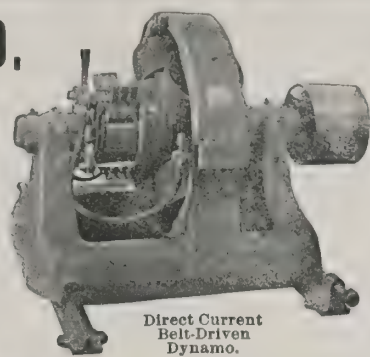
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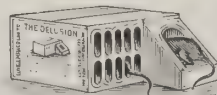
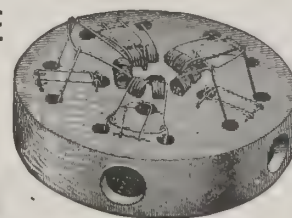
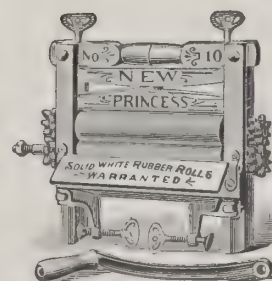
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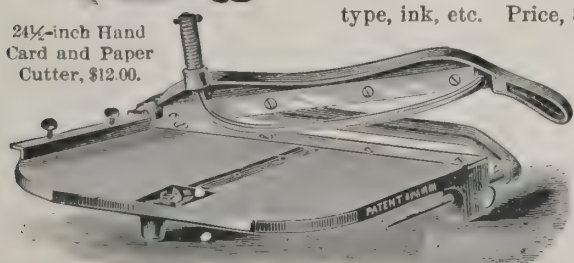
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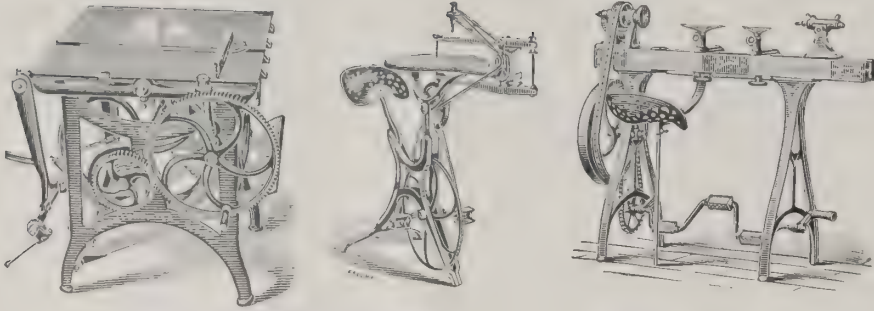
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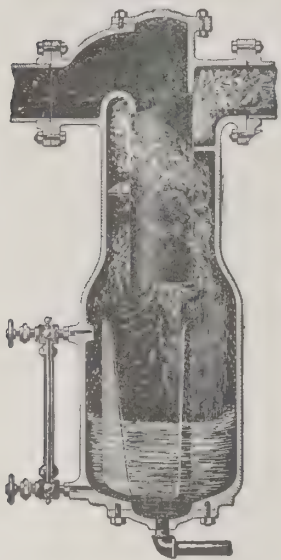
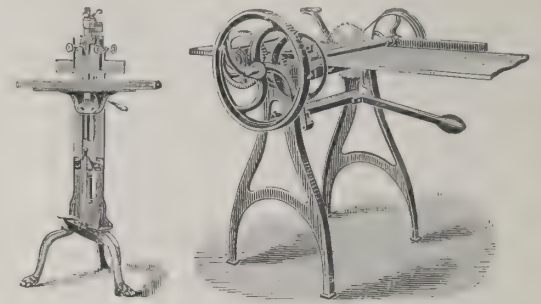
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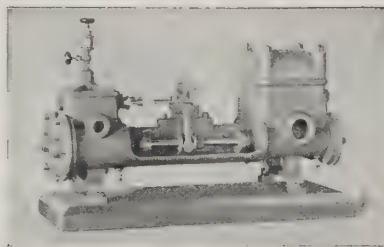
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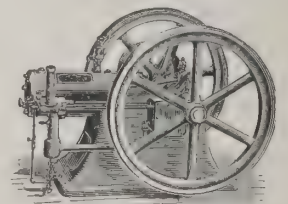
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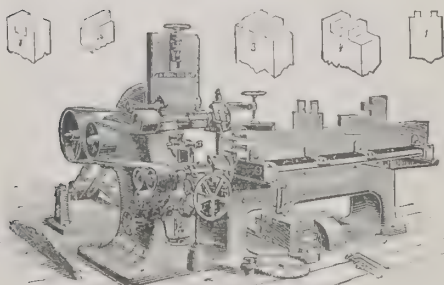
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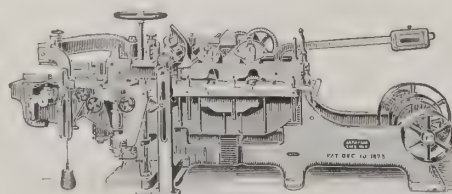


## Words of Advice to Woodworkers:—

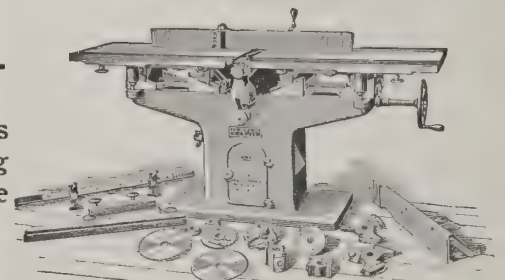
When you buy machinery don't take the first lot offered because it seems cheap, but permit us to figure with you. We manufacture more Woodworking Machinery than any other concern in the world, and guarantee ours to be THE BEST.



No. 5.—Universal Car Tenoner.



No. 5.—Extra Heavy Molder (10, 12 or 14 in. wide).



No. 3—Variety Wood Worker

In writing, to save time, tell us about what you want that we may submit illustrations and prices of machines adapted to your use in the first letter to you.

**J. A. FAY & CO.,** 251-271 W. Front Street,  
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DEVOTED TO THE FOREIGN TRADE IN MACHINERY AND HARDWARE.

### The Drop in Rails.

IN 30 years the price of steel rails in this country has dropped about \$150 per ton. In 1867 the output of American mills was under 10,000 tons, which was the limit of the capacity at that time. This year the output will be over 1,000,000, and the producing capacity is over 3,000,000 tons. It is not surprising that rails are cheap. The surprise lies in the vitality which the rail pool has shown in keeping prices as high as they have been during the last few years. The pool has gone to pieces of its own weight in the face of a stubborn refusal of railway managers to pay an artificial price out of decreased earnings. While the strife between conflicting interests among the manufacturers, very naturally carried the price two weeks ago to an abnormally low figure and a reaction, such as has taken place, was to have been expected, it is pretty well settled that rail prices will not resume the level of \$26 to \$29 per ton again for some time at least. And it is not right that they should. It is well known that rails can be made at Pittsburg for \$17 per ton, covering all allowances for interest and depreciation. The cost at Chicago is slightly higher because of the higher price of coke and some minor items of that nature. The ore costs the same and the facilities for manufacture at the two points are on a par.

In view of these conditions, \$25 and \$26 per ton is too much to ask the railroads to pay, and they are not likely to pay that price again under the same market conditions. Indeed, it is improbable that the manufacturers will fail to heed the lesson of the recent upheaval in their relations with themselves and with the railway companies. It has been demonstrated that a fair price stimulates buying, while a high price is as barren of profits as an extremely low one. It has been the practice of the mills to make money enough out of their rail business to even up the losses or absence of profits on billets. This they must now change. The price of billets will have to more nearly approach that of rails. It is preposterous that rails should be held at \$25 while billets sell for \$15, when the difference in the cost of manufacture is about \$1 per ton.

Another change which has taken place is likely to be a permanent one. That has reference to American mills competing in the markets of the world. We understand that it has long been the ambition of Andrew Carnegie to have steel rails with the stamp of his company on them laid in the tracks of foreign lands. The fact that he has of late opened offices in England and elsewhere and within ten days has booked orders for 100,000 tons of rails for foreign shipment is evidence that he proposes to realize this ambition. He will not have a monopoly of the business. Other American mills are playing the same rule. It is a sort of thing that is contagious, and we may expect to see a large and increasing export trade in American rails from this time forth.

In the mean time the mills are all busy. The delivery of the enormously large tonnage ordered of late means that a large force of men will be given employment in track work. There will be a vast amount of old material thrown upon the market at prices that will invite purchases and lend a stimulus to the general business revival for which we have all been hoping so long.—*Railway Age*.

### Great Increase of Exports.

IN his message to Congress President Cleveland expressed his gratification at the rapid increase of our exports. The growth of our sales abroad of manufactured products has been remarkable. In 1892 only 15.61 per cent. of our total exports was made up of manufactured goods, and for the fiscal year ended June 30, 1896, the percentage was 26.47.

The increase of exported manufactures during the first four months of the present fiscal year has been even more marked. During these four months these exports have amounted to over \$87,500,000. At this rate the total for the year would exceed \$260,000,000, and it is fair to expect that it will go far beyond those figures by reason of the general revival of trade. Our exports of manufactured articles have risen from \$158,510,937 for the fiscal year ended June 30, 1892, to \$228,489,938 for the fiscal year ended June 30, 1896.

There has been an improvement not only of bulk but of character. A few years ago our exported manufactures were almost entirely crude articles, such as petroleum, copper ingots, etc. Now a great percentage of these exports are articles which give evidence of skill and enterprise of a higher order.

A great impetus was given to our exports of fine manufactured articles by the present tariff, which placed upon the free list so many articles on which our manufacturers had to pay a tax before.

### A Novel Steamship.

THE latest and the most unique plan for an ocean flier is the idea of a Greenfield (Mass.) inventor. When his scheme is carried out, which he fervently hopes will be shortly, but which seems a most misty probability, Bazin, the French inventor of the roller boat, will have been eclipsed, marine architecture will have been revolutionized and the present records of the great transatlantic steamships will seem like ferryboat time. They will have been reduced about one-half.

The inventor is John W. Thompson, and he claims to have solved the problem of rapid ocean travelling by a plan of the most original craft ever launched upon the water. What he proposes to do is nothing more or less than to send a huge craft across the Atlantic on wheels. This may seem a somewhat startling and incredible statement, but such, nevertheless, is the novel plan of the Yankee inventor. The hull, or the body, of this seemingly strange marine device is designed not to touch the surface of the water at all, but will rest on huge cylinders. These cylinders are hollow and airtight, and their combined buoyancy is expected to sustain the immense hull.

#### TWO MODELS OF THE CRAFT.

In working out the theory of this decidedly new departure in marine architecture two different styles of craft were suggested to the designer's mind, both, however, on the original principle of air support. The first model is as already described and designed to lessen the draught of the marine novelty. In the case of this structure the cylinders will not extend more than 18 feet below the water level, thus giving the new class of ocean travellers a great advantage over the present big steamships when entering shallow harbors or crossing sand-bars, which prevent their entrance to many ports at the present time.

The other model shows a system of smaller cylinders revolving on an endless chain, while the craft is sunk deeper into the sea than her companion ship. The hull of the craft of light draught is similar in appearance to the ordinary ocean steamship as constructed at present, with a portion of the bottom sliced off a short distance above the keel. The bilge, however, will be very slight, her sides being almost perpendicular.

The length over all will be about 650 feet, a trifle longer than the *Lucania*. The distance from the floor of the lower hold, or bottom, to the top of the deck-house will be about 120 feet.

#### MAMMOTH PADDLE WHEELS.

The immense cylinders which are to float and propel this novel craft are virtually mammoth paddle wheels. They will be 50 feet in diameter and 30 feet in width, and are fitted in place on either side of the ship. On the outside a number of wide strips of steel are attached, running lengthwise on the surface of the cylinders, thus forming the paddle wheels. From either side of the hull stout stanchions are suspended. The lower end of each stanchion is provided with a socket, and in these fit the short shafts extending from each cylinder end. On these shafts are solidly fitted large cog wheels, the cogs fitting into a powerfully-welded link chain. In the lower part of the hull, between the cylinders, are three shafts, also with cog wheels on each end. Three powerful engines revolve these shafts. The chains fit on these cogs, and when the engine starts the cylinder is in motion.

In his second model the inventor works from an entirely different design. The hull he makes longer, the beam broader, and instead of the four large cylinders an endless chain running through and underneath the vessel from bow to stern furnishes the propelling power. The hull is not unlike that of the first model, but is somewhat differently constructed inside to admit of the passage of the cylinder chains. The cylinders forming the endless chain are held together by stout steel bands, in this manner forming the chain. Four lines of these cylinders pass through and under the craft, running from stern to bow through the hull, and take the opposite direction while travelling aft underneath. At either end of the hull are huge sprocket wheels, around which the chains revolve.

#### FOUR CHAINS OF CYLINDERS.

Each chain is made up of 60 cylinders, making 240 in all. As will be seen, just one-half, or 120 of the cylinders, are submerged at the same moment, serving as carriers of the vessel. The remaining 120 are being driven forward toward the bow by the engines. Each cylinder has a buoyancy of about 125 tons sustaining power, or in all 15,000 tons. Each line of cylinders is divided into three sections. Each section is worked by its own engine, making twelve engines in the hold. For a vessel of the size described each engine complete should weigh about 100 tons, their combined weight being 1,200 tons.—*New York Herald*.



### What Is Money?

THE following is an article which appeared in Bedford's *Magazine* of February over the signature of the new Secretary of the United States Treasury: "We are all deeply interested in getting a practical comprehension of what money is in its essential nature. Let us study it in the past, for the past can in all things teach us.

"Since man began to produce anything by his skill or industry he has been in the habit of exchanging those products of his labor which he did not need for his own use for some portions more or less great, of such things as other men by their skill or industry were able to produce beyond their own needs, but differing in kind from his own. These products were originally directly exchanged for each other, but it came about, in the evolution of ideas, manners and customs of all people sufficiently advanced to be called civilized, or semi-civilized, that some one product of human skill or industry possessed a quicker and more universal exchangeability than any other.

"At different periods and among different people this one peculiar thing was constantly and everywhere the same. At one time or place it had been a beaver skin, at another shells or beads, at another cattle or slaves, at another iron, copper or brass, at another silver or gold.

#### "SURVIVAL OF THE FITTEST.

"Now, by reason of this peculiar and universal exchangeability, the price or exchangeable power of all commodities came to be expressed by the quantity of this one peculiar commodity for which they could be exchanged. It was natural that a name should be attached to this peculiar thing, and that name was money.

"In modern times, among civilized citizens, gold and silver have superseded all other commodities as money. But they do not differ in their essential characteristics of desirableness in themselves from those other commodities which, in ruder times, among more primitive people, were equally entitled to the appellation money.

"It does not need a moment's thought to satisfy us that it was by a true 'survival of the fittest' that gold and silver finally obtained universal recognition as money, and superseded all other forms of it.

"With this general statement thus made, I will ask and answer a few questions which will lead by the shortest route to the end of my subject.

"Q. Would not some other thing than silver or gold have been just as useful, just as exchangeable and just as much entitled to the name of money if these had not been selected?

"A. Yes; perhaps so; but it is sufficient that society has adopted these two, and in such a matter the individual may well go with the crowd.

"Q. Ought there not to be more money in circulation? Is there now enough for the wants of trade?

#### "HARD TO ANSWER.

"A. The question cannot be answered by either an absolute yes or no. I am not aware of any well-ascertained data by which the question, Is there money enough? can be definitely answered. There has been an increase in volume within the last fifteen years much greater in ratio than the ratio of increase in the volume of things to be exchanged. There are those who affirm that there is not half enough. My opinion is that there is enough. A reasonable amount of good money is better than a larger supply of an inferior kind, since either has to be bought and paid for by honest labor.

"Q. Would silver and gold be rightly entitled to the name of money if they were not coined at the mint and the value of the coin determined by law?

"Yes; they would exchange as freely as now, and would then, as now, be entitled in every sense but a technical legal one to the name of money. I repeat that, essentially, gold and silver bullion are as much entitled to the name of money before being coined into dollars or sovereigns or francs as afterward. The law recognizes, gives sanction or forbids, but it is powerless to create.

"Q. Does not the legal tender sanction which the law places upon the issues of its mints give a new and original value to such legal tender coin?

#### "LAWS OF LEGAL TENDER.

"A. No. The laws of legal tender give a standing interpretation to the language of a contract, when such words as dollars, pounds, francs are used, and thus notifies both parties to a contract in advance of what the law will require which it would not otherwise have.

"Q. How, then, is it that 412½ grains of silver, coined into a silver dollar, will exchange in the market for 25⅞ grains of gold, while as bullion the same quantity of silver will only exchange for about two-thirds of as much gold?

"A. There is one simple answer which completely explains the disparity. For some years past, and at the present time, the United States Government has been and is in the receipt of an income through tariff duties and excise dues of about \$1,500,000 per day. This it disburses in payment of the interest and toward the principal of its debt for pensions and for general administration expenses. Upon its debts and to whomsoever desires it pays gold coin on the basis of 25⅞ grains to the dollar; from whomsoever desires to pay money into the Treasury through the excise dues it will receive as of equal value gold coin or silver dollars containing 412½ grains each. Thus it practically buys that amount of coined silver, giving in consideration an exemption from the payment of 25⅞ grains of coined gold.

"Q. Cannot the Government continue this forever and thus forever preserve a higher value to the silver coin than its equivalent in silver bullion?

"A. No; because by the continued coinage of silver in its present ratio to the coinage of gold, about 3 to 1, that is to say, 54,000,000 of silver against 20,000,000 of gold per annum, the proportion of silver payment to the Government will steadily increase, until the Treasury Department will be obliged to

either pay in silver or buy gold in exchange for it; with free coinage of silver this result will be soon reached.

#### "THE FREE COINAGE QUESTION.

"Q. Then you do not believe that the free coinage of silver, as now proposed, would enhance the value of silver bullion and restore the old relations of 16 to 1 between gold and silver?

"A. Free coinage of silver would no doubt give to 412½ grains of silver bullion, nine-tenths fine, as much value, or purchasing power, as would be contained in the coined dollar, and if the Government or some other power rich enough would forever give gold for silver in the ratio of 1 to 16, then the old ratio of 16 to 1 could be maintained.

"Q. Well, then, if it be impossible to maintain the practical use of two kinds of money like gold and silver in a fixed ratio, which of the two is it wiser to use?

"A. The answer must depend on circumstances. If a country is isolated from others, has no commercial relations outside its own boundaries and desires to establish none, then it may be said that it is quite an indifferent matter which of the two shall be the recognized money. Either will do. So far I have not made any reference to paper money, so called. There is a distinct and radical difference between gold and silver money and paper money.

"Gold and silver are real money. They carry their exchangeable value in themselves. Paper money derives all its power from its relation to real money, and has no value in itself, and can serve no purpose, either of use or ornament. Paper money is a promise or warrant, which entitles the holder to real money when it is asked for by him. Thus related and kept effective paper money is an economy.

"I might also speak of checks, drafts, bills of exchange and promissory notes, which in modern times operate in the exchange of commodities. They might be called, one or two degrees removed, a kind of paper money. They perform in a limited way the same functions that paper money performs in a larger way, and, like paper money, they economize the use of real money. Economize it as they may, however, they cannot wholly supersede it, certainly not in this or any immediately following generations. LYMAN J. GAGE."

### Olive-Green Paint for War Ships.

IF war were declared to-morrow, olive green would be the color adopted by all the ships of the new navy. The Navy Department is prepared to issue a general order directing the use of this color when emergency demands it. The instructions which will accompany the order are based on the experiments made with the ram Katahdin and the torpedo boat Cushing.

The experiment with the Cushing demonstrated that for certain specific work there were shades of green better adapted than the olive tint, but on the whole the olive tone served the best for all-round work. During the late war the Southern blockade runners had recourse to a gray or drab color. There were no electric searchlights in those days, otherwise a better color could not have been selected for showing up well under the rays. As a matter of fact, white is readily picked up by a searchlight, and for this reason torpedo boats usually first disclose the white, foaming water at their bows as they come charging in. The steam torpedo tubes serve as an obstruction to a boat which is driving at full head on, and tend to throw up the water. Recent boats are without bow tubes to obviate this very objection. In the daytime, however, a drab-painted ship is with difficulty seen on the horizon. Her smoke will betray her presence long before the hull shows up, and when the coal employed is anthracite, the difficulty is still more enhanced.

The Katahdin experiments show, however, that olive green, under certain conditions, is fully as invisible in the daytime as gray, while at night it is immensely superior to all other ship colors. The gray harmonizes with the atmosphere, while the olive green approaches close to a water shade, such as is common on the coast. For deep sea work the gray, or a bluish gray, is better for daytime. A vessel engaged in commerce destroying on the high seas may still find it advantageous to employ the old blockade running color.

War ships have to fear constantly the attack of the torpedo boats of an enemy, and vice versa, the torpedo boats have to fear the rapid-fire guns of the vessels they attack. The success of a torpedo boat charge depends on being able to get close home to the object to be hit, close enough to discharge a torpedo. To escape, the boat must be under fire for the least possible time. The searchlights of the enemy will be found playing at all times over the water. It is to keep from being recognized for as long as possible that has made it so grave a necessity to find an almost invisible color.

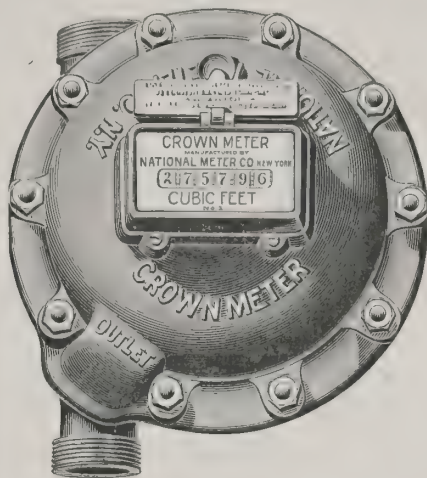
The Katahdin, while lying in the lower bay recently, was nearly run down several times by merchant steamers. The presence of the war ship was not observed until she was close aboard. While lying at the Cob dock of the Brooklyn (N. Y.) Navy Yard recently the Katahdin had to be sought out by keen eyes to be seen from the river. Unless one's attention was directly called to the ship one might pass up and down the stream and never notice the low-lined craft in the distance. In adopting olive green as a war color the Navy Department is not to be credited with taking the initiative. This color was employed by the loyal ships of the Brazilian navy in 1894, and it is understood to be the color which the British will use in time of war.

—H. B. Thayer, manager of the Western Electric Company, New York, returned lately from an extended and successful business trip to Japan. While in Japan Mr. Thayer acquired the native language as well as a large order for telephone supplies. The government is to spend \$7,500,000 in the extension of the telephone service throughout the empire.



Interesting Information for Water Works Officials about

# WATER



# METERS

They measure correctly the amount of water passing through a pipe.

**They increase the revenue,  
Restrict the waste,**

and assist in maintaining a uniform pressure in the water main.



We have many letters of similar character, copies of which we would be pleased to mail you.

## NATIONAL METER CO.

298 BROADWAY, NEW YORK.

**The Largest Water Meter Manufacturers in the World.  
Over 177,000 in Service.**

[MARCH, 1897]

City of Highland Park, Illinois.

NATIONAL METER CO.,  
298 Broadway, New York.

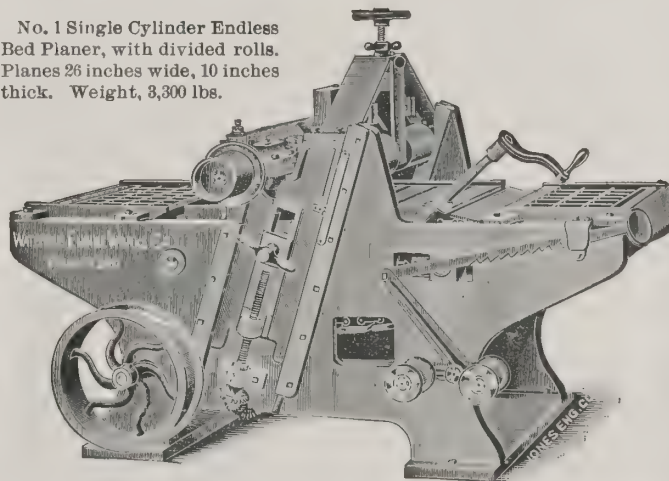
GENTLEMEN:

Replying to your favor of the 3d inst., would say that the city of Highland Park adopted the meter system in their water works in the winter of 1894-95. The result has been a material increase in revenue from the system, and a decrease in pumpage of at least 40 per cent. The water takers are well pleased with the service, as each pays for what he actually consumes. The city derives another advantage from the fact that leakage is quickly discovered, thereby increasing the economy of operating the system. Our experience has fully satisfied the most skeptical that meters soon pay for themselves in increased revenues on the one hand, and reduced cost of operating on the other.

Yours very truly,

J. C. CUSHMAN.  
Chairman of Water Committee.

No. 1 Single Cylinder Endless Bed Planer, with divided rolls. Planes 26 inches wide, 10 inches thick. Weight, 3,300 lbs.

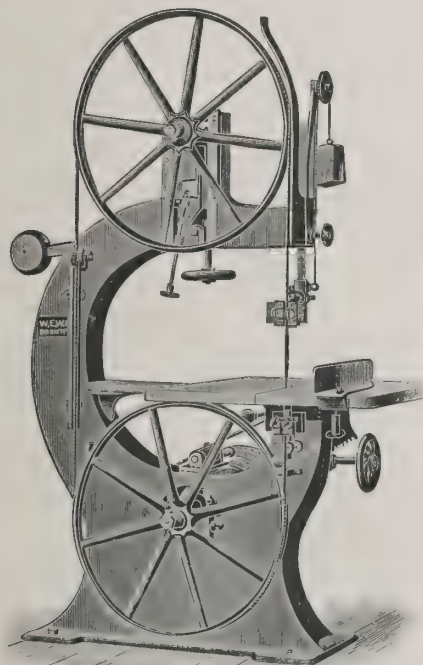


## Wood-Working MACHINERY.

No. 1 E. B. Planer. Weight, 3,300 lbs.; like cut.  
No. 1 Double Cylinder E. B. Planer. Weight, 5,300 lbs.  
No. 2 E. B. Planer. Weight, 2,600 lbs.  
"Champion" Combined Planer, Matcher and Moulder.  
Planes 24 inches wide up to 6 inches thick. Best all-around machine.

MANY OTHER STYLES AND SIZES,  
AND FULL LINE OF  
WOOD-WORKING MACHINES.

Long experience in the export trade is  
a satisfactory guarantee.



No. 3.—36-inch Wheel. Weight, 2,000 lbs.

## BAND RE-SAWS.

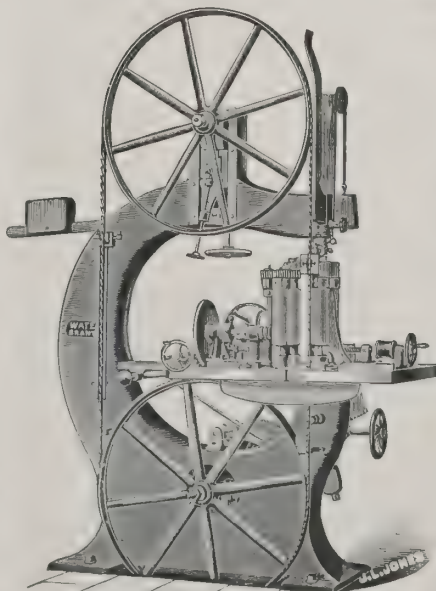
No. 5 Band Resaw.—48-inch wheels; saws 24 inches wide, 5 to 40 feet per minute. Resaw swings clear of machine when required. Weight, 4,500 lbs.

No. 6 Band Resaw.—48-inch wheels; takes saws to 3 inches; cuts 30 inches deep. Weight, 4,300 lbs.

No. 7 Band Resaw.—54-inch wheels; 4-inch saws; cuts 30 inches deep and to center of 10 inches. Weight, 5,300 lbs.

OTHER SIZES MANUFACTURED.

FULL LINE OF  
**Saw Mill Machinery.**



No. 4.—40-inch Wheels and Removable Resaw. Weight 2,750 lbs.



1844.

NEW  
PREMISES.

1896.

January, 1896, we moved into new premises, securing unsurpassed facilities for executing contracts promptly and satisfactorily. Order direct or through your commission house, sending us copy of order.

**Saw Mill Machinery Our Specialty.**

There are some 300 of our saw mills running in South and Central America, Europe, Asia and Africa, of different sizes, from those cutting logs 6 feet in diameter to small mills sufficiently portable for mule-back transport.

# WATEROUS,

BRANTFORD,  
CANADA.



### Ice, Natural and Made.

ACCORDING to the testimony of an expert with whom the writer had an interesting conversation a day or two ago, there are probably 3,000,000 tons of ice used in Greater New York in the course of every year. About one-half of this prodigious quantity is consumed in the four hottest months. The consumption in June, July, August and September is, therefore, at the rate of about 12,000 tons a day, and of that, in the opinion of the expert, about 2,500 tons are manufactured. A question or two on the subject set the expert to talking, and he did not confine himself to a single phase of the topic.

"There are, I suppose," said he, "about thirty plants for the manufacture of ice in the Greater New York. Some of them are carried on in connection with other businesses, such as cold-storage warehouses and breweries. The first icemaking machines were invented back in the fifties, but the product was little better than snow. Some twenty years ago great improvements were made, and within the last few years there has been a marked reduction in the cost of these machines. The process of improvement has also gone on rapidly. Such a machine to-day costs less than half of what it cost five years ago, and the business of making ice can now be gone into on a commercial basis, just like the milling business, for example.

"By the improved processes it is possible to manufacture ice that is chemically pure, and all artificial ice is far superior in point of purity to almost all natural ice. Where the latter is taken from a mountain lake, which is so sheltered that no dust can get into the ice, and it is frozen under the right conditions, it is practically pure. But such conditions are hard to find, and most of the natural ice sold in the city is far from pure. Artificial ice, however—at least, that made with modern machines—is made from distilled water, and if any sort of care is taken it can be kept absolutely pure. It can be made cheaper than natural ice, can be put on the market, and will probably drive out the natural sort in time. In certain establishments it is found economical to use the exhaust steam for making ice, for it saves distilling water for that purpose.

"I know of an establishment where one ice machine is used for cooling a warehouse; it is necessary to have a second in case of breakdown, and the second machine is used regularly in making ice, which can thus be turned out at low cost. They make sixty tons a day. If it should be necessary to use the second machine for the regular business they would have to draw on their reserve, or else buy ice from some one else to supply their customers temporarily. In such a warehouse it is easy to keep ice in reserve, if there is a room for it, and as the temperature is readily kept below the freezing point such ice does not deteriorate, as does that in an ordinary icehouse.

"Now as to meats, frozen carcasses of sheep have been carried from New Zealand and Australia to England for a number of years, and most of the mutton now eaten in London comes from the other side of the world. It is first cooled and frozen, and after being put on the ship the chambers in which it is stored are kept cool by the constant use of refrigerating machines. There is no difficulty about this except near the mouth of the Red Sea, where the temperature of the water is invariably high. It will average 120 degrees at the surface, but by going down below the surface stratum they can get it at about 110 degrees. Even then the refrigerating machine does not work well. If water is taken at a temperature of 60 degrees, when it leaves the machine it will be at 140 degrees. That is, 80 units of heat have been added to it. But if it is 120 degrees or 110 degrees when pumped, the number of units is greatly reduced.

"When they come to that part of the voyage it is the practice to run the temperature down as low as possible. If it is usually kept at 16 degrees they will reduce it to perhaps 6 degrees, and take extra pains to close things up tightly. Thus they will be able to get past the critical point without allowing the temperature in the meat chambers to fall below 28 degrees. Of course the water is warm also in the Suez Canal, but not nearly so much as at the mouth of the Red Sea; still they are always anxious to get through as rapidly as possible, and are much vexed by the delays that sometimes occur from the drifting of sand into the canal.

"In our own waters there are two fishing vessels fitted up with refrigerating apparatus, by which fish are frozen at sea as fast as taken. They thus come into market in fine condition. The old way was to pour water over them and freeze the entire mass solid; but that made a good deal of extra weight to carry. Now, after the fish are frozen, it is thought best simply to glaze them with ice and keep them in that condition.

#### A GOOD THING TO KNOW.

"There is another point in connection with ice that many people lose sight of. Suppose a 100-pound piece of ice is left on the sidewalk at your house, and suppose that it is allowed by the servant or the janitor of the house to lie there until it weighs 90 pounds. You would naturally suppose that you have lost 10 per cent. of the ice. If it is hot weather, however, the chances are that you have lost 50 per cent., or at least 40. That is because of the latent heat that has been absorbed, which will cause the ice to melt much more rapidly than otherwise. There is some latent heat absorbed by ice carried in a wagon, of course, but it is not exposed to the direct rays of the sun to any extent, and where there is a large quantity only that on the outside is exposed.

"It has been demonstrated that it is possible to carry refrigerating fluid—and by that I mean a form of ammonia—in pipes for a distance of two miles, and then it can be carried into houses and other buildings just as gas and water now are. When connected with refrigerators and cooling chambers the refrigeration is under control just as water and gas are, by the turning of a cock or faucet. The degree of cold can also be regulated. Anhydrous ammonia is used. It liquefies under pressure, and expands into a gas when the pressure is removed. Only in the gaseous form is it a refrigerant. The pressure employed

to liquefy it is sufficient to carry it the distance I have named. If this method of refrigerating should be generally employed it would do away with the ice business to a large extent. The objection to it is that it involves tearing up streets in order to lay pipes, and people generally are opposed to anything of that kind, unless there seems to be a real necessity for it."—*Tribune*.

### A Great Magnet.

THERE is in the New York Eye and Ear Infirmary a marvellous magnet of sufficient power to lift sixteen pounds, but its lifting power is as nothing when compared to its gift for saving the sight of human eyes. When viewed as an eye instrument it is a giant in size, and, indeed, it is as powerful as a giant is supposed to be, for it takes 120 volts of electricity of the incandescent light circuit to actuate it. It is the strangest and one of the most reliable "eye doctors" to be found within the length and breadth of Manhattan Island, or anywhere else, for that matter.

Every metal worker, every iron worker, every man who works where particles of metal of any sort fly about is likely to get such a splinter in his eye. Time was when that meant blindness, for there is no operation that ever becomes necessary to perform on any human organ which is more delicate than an operation involving the retention or loss of the eyesight.

One would think that a magnet possessing sufficient electrical attraction to lift a substance weighing sixteen pounds, with a two-inch contact, would bring anything out of an eye. It so happens that when an eye which has become the unhappy possessor of a fragment of iron or steel is brought near this magnet the presence and location of the metal is immediately made manifest by a bulging of the coats of the eyeball. This is the exact spot located, and with the attraction continued at full limit the matter of the extraction of the particle becomes simple.

#### THE MAGNET THAT DOES THE WORK.

The magnet rests on a swivel, and this swivel is placed on a stand. The magnet itself is twenty-four inches from pole to pole. It is formed of two cylindrical parts, each of which is wrapped with wire. Without the wrapping one section of the magnet is about a foot in diameter. The two poles are joined by a metal bar, circular in form, its diameter being three inches and its length the same. There extends from the outer end of each cylinder a series of top-like extensions about four inches long, which terminate with pointed pegs.

The circular bar which joins the two wire-wrapped cylinders rests upon another bar, also circular in form, of the same diameter, upon which it swings by means of a swivel. This bar rests upon a wooden platform eight inches square, at each corner of which is a peg, knobbed at the top. To each of these pegs an electric wire is fastened, and every wire extends up along the wall near which the magnet stands. The eight-inch platform rests on a square block about three inches in height, and it in turn rests upon a table which is about two feet square.

Under the old method, if the particle simply adhered to the surface of the eye it could be easily swept off, after the eye had been cocained, by means of a little absorbent cotton, twisted around a probe or a wooden toothpick. It is when the particle is deeply imbedded in the eye, or has forced its way into that portion of the orb known as the corneal tissue, because of striking the eye while hot, that it becomes necessary to use instruments or a magnet.

#### OPERATING ON THE EYE.

When a patient comes to the doctor to be treated for an injury to the eye he is seated in a chair with a headrest, facing a good light. The doctor first steadies the eyeball with the thumb and forefinger of his left hand. Should he discover that the bit of metal is very minute and not to be readily seen, he calls an assistant, who focuses the light upon the eye by means of a large six inch reading lens. When he finds that the particle can be seen nicely he takes the gouge or the bistoury, the two dainty and yet terrorizing instruments of the eye specialist, and with the point of either he makes an insertion beneath the particle, and in a moment, if the surgeon be skillful, the metal is out upon the surface.

It must not be understood that the use of the magnet renders altogether unnecessary the instruments referred to. The attraction of the magnet causes the surface of the eyeball beneath which the bit of metal is lodged to bulge out, showing the exact position of the particle. This is where the surgeon finds it necessary to use the gouge or the bistoury, just as in an operation where the magnet was not used. The advantage in this case is found in the fact that there is no delay or doubt as to the location of the offending particle.

How is it when the particle merely adheres to the surface of the eyeball instead of penetrating the tissue in great degree? Eye and magnet are brought into juxtaposition. The eyeball is bared to the full extent of the electric current. In less time than eye twinkles the particle, as if endowed with life, fairly leaps from the eyeball to the magnet's surface.

ACCORDING to a tabulated statement just completed by the American Embassy in Berlin, based on the reports of 52 American consulates in Germany, German exports to this country for the last quarter, from October to January, have fallen off from 25 to 40 per cent. in a majority of the consulates, while they have increased in but five consulates. The total per cent. of decrease for the whole empire is fully 25. The decrease is in the volume of export of textiles of all kinds, chemicals, machinery and notions. The only increase of exports was in the case of sugar, made possible by the Wilson tariff law. German manufacturers admit that the great decrease in their exports to the United States is due to the constantly growing skill of American manufacturers, who now turn out products that meet every requirement of the home market.





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Immediate and strong siphonic action,  
With a cistern valve that can be regulated  
for any discharge,  
Every part constructed of best known materials and workmanship

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Water Closet,

which represents the greatest improvement  
in sanitary appliances, made by

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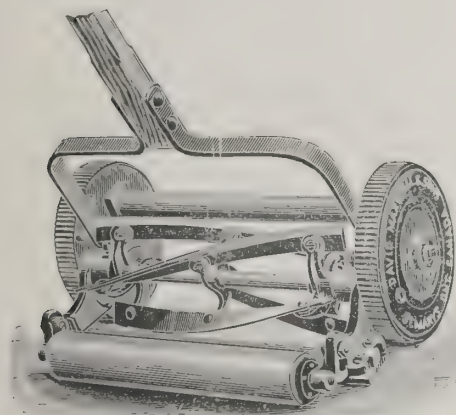
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FOR THE PRESERVATION OF THE  
BOTTOMS OF WOODEN  
VESSELS.

TESTIMONIAL.

From DEVONPORT FERRY CO., L'd  
Auckland, N. Z., May 20, '91

To C. A. WOOLSEY PAINT  
AND COLOR CO.,  
Jersey City, N. J., U. S. A.

Gentlemen—I have great pleasure in recommending Woolsey's Copper Best Paint. I have used it on my Company's steamers for a number of years past, and it has given entire satisfaction.

The Devonport Ferry Company's steamers "Britannia," "Victoria," "Alexandra," "Takapuna" and "Tainui" are now coated with Woolsey's Copper Best Paint over Metal Sheeting.

Faithfully yours,  
ALEX. ALISON, Manager.

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Our Kalsomine is made of the best selected material and the tints and colors are particularly brilliant and clear. We are selling large quantities in the foreign markets with gratifying results. Send a sample order. You can make no mistake, for it is the best Kalsomine in the market.

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### CAR COLORS.

GROUND IN JAPAN.

TESTIMONIAL.

CHARLOTTE, MICH.,  
March 17, 1890,

C. A. WOOLSEY,  
Dear Sir—We have used your colors for the last two years and we like them better than any we have ever used. Your Black, Wine and Greens are very fine colors, being very finely ground and having a good strong body. Your Ruby Red, we think, is the finest Red in the market, and full as nice as Carmine.

Yours truly,  
MAY & BARNEY.

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FOR

LADIES' AND CHILDREN'S  
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Boston, Mass. London, Eng.





## Ailments of Trades.

IT is well known that there are a number of dangerous trades which give rise to serious diseases; but, as a matter of fact, almost every occupation has some ailment peculiar to itself. A doctor can always tell if his patient is a baker, for instance, by the state of his teeth. The flour dust collects on the teeth, becomes acid and gives rise to a special kind of decay. Bakers, owing to their irregular life, sleeping in the day and working at night, and because of the hot air and dust, are great victims to consumption. Blacksmiths, strong as they are, very often suffer from paralysis of the whole right side from the continuous shock of hammering, and their eyes become weak from the glare of the fire.

Athletes, strange to say, do not, as a rule, enjoy long life. Professional boxers, wrestlers, gymnasts, cyclists are short lived, and suffer from enlargement of the heart and diseases of the lungs. Boilermakers get deaf from the continual loud noise. Brewers and brewers' drivers drink beer in such large quantities that they ruin their livers and generally die young. Bricklayers and plasterers are very healthy, and they are said to resemble asses in never dying. Butchers are very strong and healthy, but they suffer in health through eating little pieces of raw meat. Cabmen are noted for "nipping," and they endure the natural consequences. The cold also affects their faces to such a degree that the muscles of the face become frequently paralyzed.

Carpenters and cabinetmakers are afflicted with varicose veins in the legs, and the action of the shoulder in sawing and planing produces a diseased condition of the large artery that runs from the heart to the arm, so that there is not a carpenter living, a doctor says, in whom a curious noise may not be heard by applying the ear to that blood vessel. Hardly a single china scourer lives to old age without becoming asthmatic. Clergyman's sore throat is, of course, well known. It is said by some to result from having the mouth open so frequently, the air going in that way and drying the throat. Others say it is caused by the clerical collar. And others still say it results from the fact that the clergyman preaches from a pulpit and has to bend his head downward; for barristers, who talk quite as much, do not suffer as much as clergymen, being on the same level as their hearers.

Miners, from working in the dark, become very irritable; their eyes get weak and their lungs become quite black—miners' lung. Cooks, particularly male cooks working in hotels, clubs and restaurants, get gout from continually tasting rich food; and both male and female cooks get varicose veins and flat foot, from long standing, as well as the well-known ache of the face, from the heat and dirt. Coopers have a lump on the knee, which is really a little bag of fluid, put there by nature to protect the knee from the injurious effects of pressing it against the barrel. Divers' hearts become distended, from holding their breath.

Domestic servants are remarkable for suffering from typhoid fever, and housemaids are frequently afflicted with poverty of blood, from drinking tea and running upstairs. Dressmakers' long hours and confinement result in consumption very often, but more often in indigestion, poverty of blood and impaired eyesight. The fumes of nitric acid make goldsmiths' eyes sore, and they get cramps in their fingers from catching small screws. Nearly all the human beings who suffer from that awful disease—glanders—are grooms.

India-rubber workers have very bad headaches and great mental depression. Painters are poisoned by the lead they use so much, and all their muscles, but especially the wrist muscles, become very weak. Photographers get poisoned by cyanide of potassium. The dust that enters the lungs of potters when they are sifting clay interferes so much with their breathing that "potters' asthma" is a well-known disease. Compositors get cracks and fissures in their lips and small tumors in their mouths, from the habit of putting type in the mouth, and consumption attacks them frequently, because of the stooping posture and the confined and sedentary life.

Publicans are the greatest sufferers of all—the constant dram drinking giving them indigestion, jaundice and nervous diseases, and killing them at an earlier age than members of any other profession. Sailors, very singularly, suffer greatly from consumption, owing to the cold and damp and the bad air of the forecastle. Salesmen and saleswomen in shops have a lot of standing, which gives them varicose veins and pains in the feet. Cloth scourers, who inhale benzine and turpentine, suffer much from headache, lassitude and nervousness. Shoemakers get their chests pressed in by the last, lose their appetite and strength and have headaches. Stonecutters' eyes are often injured by particles of flying stone.

Teastasters, although they only take the tea into the mouth and do not swallow it, become so nervous that they can follow their employment for only a period of eight or ten years. The sedentary life of lawyers, artists, students and literary men gives rise to gout, which is said to kill more wise men than fools; dyspepsia, which made Carlyle's life such a torture, and apoplexy, which carries off hosts of great men.—*Pall Mall Gazette*.

—In point of value, pig iron stands easily at the head of the metallic productions of the United States, with \$105,196,550, while at the head of non-metallic products is bituminous coal, the value of which during the year was \$115,749,771.

—The Carnegie Steel Company has opened an office in Victoria street, Westminster, London, and announces that from its London office it is ready to make sales for the delivery of its material to any part of the world outside of America. This looks as if the recent invasion of the "markets of the world" by American steel is to be followed by permanent occupancy. Both American and German steel bars are now being used by the Welsh tinplate makers.—*Engineering News*.

## Commerce with Africa.

THE monthly statements issued by the Bureau of Statistics do not give the origin and destination of imports and exports with the fullness with which they are given in the annual reports. But the report for September, which also covers three fourths of the calendar year, gives enough of the figures in our commerce with Africa to show how fast the European colonization of that continent is adding to its commercial value to us.

The continent is a vast one, with points where the civilization and the industrial developments have reached a pretty high stage. The Cape Colony is thoroughly English, and its commercial development is not unlike that of our semi-independent British possessions. At the opposite end of the continent is Egypt, which even Turkish sovereignty and the rule of the descendants of Mehemet Ali must be reckoned to have been semi-civilized, and under the administration of Lord Cromer is increasing its production, its exports and its wealth. The people have some motive for industry, because they know that an increase in their resources will not serve only to stimulate the extortion of more taxes and more bribes. France has done something for Algiers and Tunis; Morocco is probably even farther down than Egypt was before the British occupation; at Liberia and a few European colonies there are the beginnings of civilization and industry, and then the greater part of the continent is given over to civilization of the most primitive character or none at all, where there is no commerce, or where commerce is confined to slaves and ivory—in slaves to carry the ivory to the coast.

The reason why this vast and varied region appears in the statistical reports under a single head is that our commerce with all its parts has been so small that it was not worth while to separate the trade with the commercial cases in a continent of savagery. The annual reports distinguish between Egypt and the African dependencies of the several European nations, but our commerce with the whole continent has thus far been too small to demand such a subdivision in the monthly reports.

But at the rate at which this commerce is increasing it will be important soon to discriminate even in the preliminary reports between the exports to Egypt and to Cape Colony. In the mean while it is only essential to bear in mind that, commercially speaking, Africa means primarily and chiefly British Africa; there is little demand for American goods from any other portions of the continent. Of many exports the preliminary reports make no effort to show the destination; it is only of certain selected and generally more important subjects of commerce that the region to which they are exported is stated. Among the exports that can be traced to Africa two or three show a decline since last year, but nearly all of them, as stated in the following table, show very decided gains. The following table shows the value of our exports to Africa for nine months of 1896, compared with nine months of 1895:

	1895.	1896.
Agricultural implements.....	\$257,112	\$348,665
Books and printed matter.....	18,410	27,976
Wheat.....	111,033	1,556,562
Flour.....	44,474	729,731
Carriages and cars.....	98,436	262,432
Cotton cloth.....	345,798	697,902
Bicycles.....	.....	20,628
Fruits and nuts.....	14,830	43,448
Builders' hardware, saws and tools.....	147,417	165,987
Sewing machines.....	6,478	13,872
Miscellaneous machinery.....	830,372	1,056,878
Leather.....	26,384	38,993
Spirits of turpentine.....	16,361	17,550
Mineral and cottonseed oil.....	694,729	922,932
Canned and salted beef, bacon, hams, fresh pork and lard.....	141,880	335,306
Seeds.....	313	2,434
Tobacco, and manufactures of.....	257,031	357,688
Lumber, and manufactures of.....	822,963	1,110,997
Total of this selected list.....	\$3,884,021	\$7,709,951

Of imports from Africa only two of any considerable importance are reported. One of these is Egyptian cotton, which was \$3,895,043, as against \$2,053,554 in nine months of last year, and raw sugar, which increased from \$410,755 to \$3,073,410. Coffee increased about threefold, but it was less than \$16,000 in the past nine months; hides and skins from Africa dropped from \$768,257 to \$275,508; rubber dropped from \$22,359 to \$1,212; nutmegs, pepper, etc., dropped from \$91,207 to \$39,532, and ivory from all quarters, the greater part of it coming from Africa, decreasing from \$495,833 to \$129,653. In spite of the removal of the duty our import of wool, all of the first class, from Africa only increased for the nine months from \$452,284 to \$459,979.—*New York Journal of Commerce*.

## Immense Boats.

A REMARKABLE and rather sudden increase in the length of transatlantic steamships is a feature of present development. No sooner does the Pennsylvania, 600 feet long, arrive here on her maiden voyage than it is announced that one still longer is to be constructed; this last to be the Oceanic, 704 feet long. The first-named vessel is designed chiefly for freight, and took out what is said to be the largest single cargo ever shipped from this port, over 18,500 tons measurement. This cargo would have loaded about 616 ordinary freight cars. The Oceanic will be for passenger service, and is expected to be able to make the voyage in the uniform time of six days, regardless of weather. She will be about 27 feet longer than the Great Eastern, but will not be so wide nor so deep.—*American Machinist*.





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Full directions, in various languages, accompany each bottle of our medicines.

### Ayer's Cherry Pectoral,

For the rapid cure of Diseases of the Throat and Lungs.

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For purifying the Blood and the cure of Scrofulous Diseases.

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Warranted to cure all Malarial Disorders.

### Ayer's Hair Vigor,

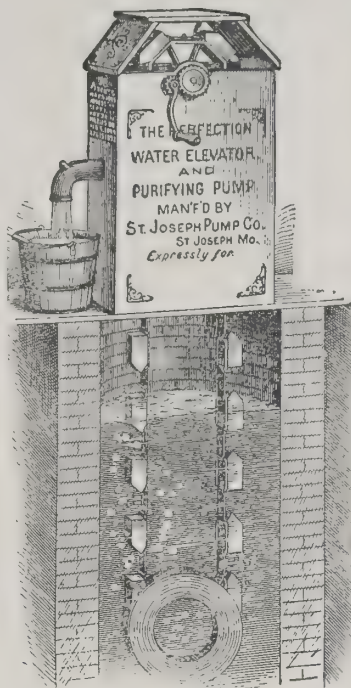
For Restoring gray hair to its Original Vitality and Color.

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The most valuable Home Remedy for all Purgative Purposes.

Prepared by Dr. J. C. Ayer & Co., Lowell, Mass., U. S. A. Dealers liberally supplied with almanacs, show cards, and other advertising material.

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A Sure Preventive against Malaria, Typhoid and Other Fevers.

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This Pump is guaranteed to purify the foulest water in well or cistern in 10 days' ordinary usage.

How does it purify?

Each bucket descends full of air and ascends full of water. For each gallon of water drawn a gallon of air or oxygen (the vital element) is circulated through the water from the bottom to the top. This not only thoroughly agitates, ventilates and purifies the water, but also forces a large supply of oxygen which is sufficient to consume all impurities or organic matter in the foulest water. It is an admitted fact by thousands using them that this Purifier is the only Pump that will destroy wigglers, water bugs and water lice, and make foul or stagnated water pure and sweet, removing all color, bad taste and smell. After a few days' usage of the "Perfection," the old flatness and insipidity in water is replaced by a sparkle like that of a mountain stream. In fact, it will make bad water good, and good water better. Write us for catalogue and book of information on impure water.

Our No. 6 Perfection (family use), all complete with chain, for 17 1/2 ft. well or cistern, \$17.00

Our No. 6 Perfection (stock use), all complete with chain, for 17 1/2 ft. well or cistern, 21.00

For wells or cisterns of greater depth (family), chain per single foot, 30c.

For wells or cisterns of greater depth (stock), chain per single foot, 40c.

We will allow you from the above list prices a discount of 50 per cent., delivered for export shipment F. O. B. N. Y. City. If you mention this paper we will allow an additional 5 per cent. Please give us plain shipping directions and state what N. Y. Broker we shall draw on for our money. Address us and write your broker.

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and side walls ought to have the closest attention of every builder and house owner. They embody many merits which only develop as you investigate them. Their chief features, however, are durability, economy and attractiveness. They are waterproof, insect and vermin proof, dustproof and practically fireproof. They are also comparatively inexpensive and everlasting.

The embossed parts stand out in high relief and afford excellent opportunity for decorating. Our designs are of the latest patterns used by prominent decorators. The steel plates are easily put in place by following the plans and instructions sent with goods. An elaborate 100-page illustrated catalogue will be sent free to those who contemplate using our goods.

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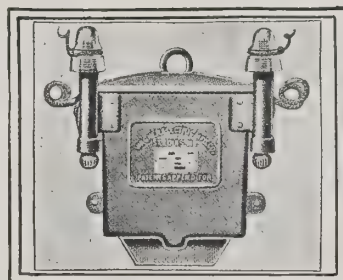
This comprises the furnishing of cornices, building fronts, window and door heads, pediments, skylights, metal church altars, fonts, etc., etc., made of galvanized iron, steel, zinc or copper. We are making these in large quantities from designs furnished us from our own plans. Experience has taught us the best ways of packing these goods for export and to accommodate transportation in foreign countries.

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COMPARATIVE TESTS, knowing that our Competitors alone had cause to fear them

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## THE BALDWIN Dry-Air Refrigerators.

ALWAYS UP-TO-DATE.

110 Varieties,  
New Styles,  
Handsome Designs,  
Low Prices,  
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Stands at the HEAD.



## THE BALDWIN REFRIGERATOR CO.,

BURLINGTON, VERMONT, U. S. A.

## New Jersey Copper Paint

LEADS THEM ALL,

So our testimonials say.

We guaranteed this Copper Paint to be the easiest to apply and, owing to its being so finely ground, it is the smoothest paint in the market.

Highest Medals from American Institute, New York City.

### NEW JERSEY RED COPPER,

For yachts. Brightest color made.

### NEW JERSEY SEAM PAINT,

A perfect substitute for pitch

## NEW JERSEY PAINT WORKS

HARRY LOUDERBOUGH, Proprietor,

JERSEY CITY, N. J.

U. S. A.

### REMARKABLE FACT.

This is a copy of a photograph of a board having one end painted with New Jersey Copper Paint, manufactured by Harry Louderbough, proprietor of New Jersey Paint Works, Jersey City, N. J., U. S. A., and placed in the water at Port Royal, S. C., for five months. Upon the unpainted end you can note the ravages of the salt-water worm so destructive to wood, and also the large number of barnacles that have fastened upon it. Observe the painted end, where New Jersey Copper Paint was applied—its splendid condition.

The board here represented was placed in the water at Port Royal, S. C., by me, and left in the water five months. The painted end was as good as when it was placed in the water.  
MILLS EDWARD,  
Master Schooner "Florence Shya."





### Looms Without Shuttles.

JOHN L. DEAN, a wealthy cotton manufacturer of Philadelphia, who has extensive mills at Manayunk and Falls of Schuylkill, has been consulting machine builders on a device which, if it does the work claimed for it, will revolutionize the present methods in textile manufacturing. The device will weave cloth without a warp first being prepared, and does away with the shuttle altogether.

The *Pittsburg Chronicle* says: "The machine is the invention of a Scotch mechanic who has been in the employ of Mr. Dean's company about three years. The Scotchman was unknown to Mr. Dean when he applied for work. He was put through an examination to find out what he knew about weaving machinery and his ability to repair looms. He answered all questions satisfactorily and was about to be given a good job when he almost spoiled his chances by announcing that he could build a loom that would weave without the use of combs and shuttles.

"Mr. Dean, as every one else in the textile business, considered this a mechanical impossibility and determined the man was demented and told him to go away.

"The Scotchman, instead of going, said: 'Well, if I cannot do that I can build the looms you use, and you would be thoroughly satisfied with that fact at the end of a week if you would employ me.'

"The mill was sadly in need of a loom boss and the Scotchman was put to work with strict instructions not to experiment with any of the looms. The Scotchman worked faithfully and at the end of a short time the company raised his wages. However, in the mill he was the subject of much ridicule because of his persistency in saying that he could build a loom to weave without shuttles. He bore all this good-naturedly, and when he had saved a little money he asked permission to erect a small machine shop in the engine room, to build a model of his machine. He had just finished extensive repairs in the mill and the request was granted. A machine shop would be a useful adjunct to the establishment, anyway, and the Scotchman was the very man to be in charge of it. In fact, he had made himself invaluable to his employers and any request he might have made in reason would have been granted. About six months ago the Scotchman invited the officers of the company to come to the machine shop at night, pledging each to secrecy. They went, more because they liked him than through any curiosity to see his machine.

"Mr. Dean said: 'He fooled us. He showed us a machine built of brass and steel. He asked us to examine it and we did, but we could not tell what it was intended for, experienced though we were in handling all kinds of textile machinery. Leaving us to examine it he produced a box of spool thread and fitted half a dozen of them into it and started the machine, using a cog gearing with a crank attachment to get speed. To our astonishment, from one end of the diminutive machine there emerged a narrow strip resembling inch-wide cotton, perfectly woven, but of course much coarser than on one of our fine looms, where we run 120 threads to the inch. The discovery of X-rays astonished the world, but the sensation it produced does not compare with the utter surprise of my partners and myself. A man we knew to be a thorough mechanic, but supposed to be insane on the subject of weaving without shuttles, had actually wrought a machine that would do it.

"None of us slept that night; in fact, we did not leave the mill. The Scotchman's secret is safe with us. We detached him from the mill and furnished money for him to carry out his 'crazy' idea. I am here in his interest principally, but intend first to visit relatives near the city. I believe that in another year our loom boss will perfect the machine, and the old, noisy looms will disappear from cotton and woollen mills.'"

### Encourage American Shipping.

CONDITIONS are now more favorable for the adoption of measures to regain our ocean carrying trade than for a generation. Our national law makers will miss a magnificent opportunity if they permit such a peculiar conjunction of affairs to pass without taking advantage of them. There have been times in the past when the national administration was in perfect sympathy with those who desired to build up American shipping interests, but other conditions were adverse. Laws have been passed which have not been or could not be put into practical effect. But a new era is now upon us. Our increasing export trade has forced upon the people more attention to this subject. Not only are seaboard interests roused to its importance, but the preponderating sentiment in the West is in favor of encouraging American maritime enterprise instead of being actively hostile, as was once the case. This important question is becoming more and more a topic of discussion among those who are considering national movements and desire to aid in the promotion of national growth. Our ability to sell iron and steel in the markets of the world is accepted as proof that we can build steamships as cheaply as any of our great competitors. Capital is lying in secure places awaiting the chance for safe investment. The avenues for trade on the ocean are plainly marked. So far as can be seen there is now absolutely no obstacle to the rapid development of a merchant marine if the proper measures should be adopted by Congress. This is the time for such a work to be undertaken, just as 1890 proved to be the proper time for taking up the establishment of the tin plate industry. And as that branch of trade speedily grew until almost our entire wants are supplied from domestic sources, so would the tonnage of American ocean vessels grow if the building up of a merchant marine were as efficiently encouraged. We need American lines of shipping now to most of the leading ports of the world, and we are likely to need them still worse in the near future.—*Iron Age*.

### Solid Rubber vs. Pneumatic Tires.

THE article in January number of the *Carriage Monthly* headed, "The Future of Pneumatic Tires," would lead one to think that the solid rubber tires used on vehicles, and now so popular, will soon be superseded by the pneumatic. On this point I beg leave to differ with the writer.

The progress of the bicycle and perfection attained, largely on account of the pneumatic tire, are no criterion, as the conditions entering into the construction of a vehicle and the uses to which they are applied are vastly different. A carriage would need to be constructed on quite different lines to make the pneumatic tire applicable, which would mean a revolution in the fundamental principles of carriage building, and before this would be considered favorably by the carriage manufacturer he would ask the question, "Are pneumatic tires practical?" To which I answer, "No."

The conditions under which a vehicle equipped in this manner is used, and the attention necessary, are quite different from that of a bicycle. First: You have four wheels to look after instead of two, each one of which needs close attention to see that they are properly inflated, so that they are equal in resiliency, for if inflated too hard they will not ride as comfortably as a solid tire. Second: The valves are delicately constructed and liable to get out of order any moment, allowing the air to escape, which necessitates immediate repairs or your tires are ruined. Third: A puncture is liable to occur at any time. This difficulty has not been overcome, although claimed by some, and it is readily understood that all these accidents are much more liable to happen to pneumatic tires on a vehicle than on a bicycle, as a bicycle being small and occupying so little space the rider can pick his way, avoiding dangerous obstructions, cross street car tracks at right angles, etc., while a driver cannot avoid these dangers so easily, having four wheels to look out for; a large vehicle to guide through narrow streets, often being compelled to drive in car tracks, which means sudden death to the pneumatic tires, as they are not protected on the sides as are the solid tires.

We all know that within the past two years pneumatic tires have been pushed to the front by certain manufacturers and put into use in every large city in the United States, only to prove a failure, and that these same people are now advocating solid tires is the best evidence brought to our notice that there is but one kind of tire adapted to vehicles, namely, the solid tire. A tire free from punctures, no valves to get out of order, cannot become detached from the wheel, neat in appearance, absolutely durable and will last for years—such a tire is commended by all. Streets may be paved with tacks and strewn with broken glass, but it would not prevent the use of solid rubber tires; they would roll on just the same, and I don't believe the carriage manufacturer is ready to adopt something he knows to have less merit.—*By F. A. K., in Carriage Monthly*.

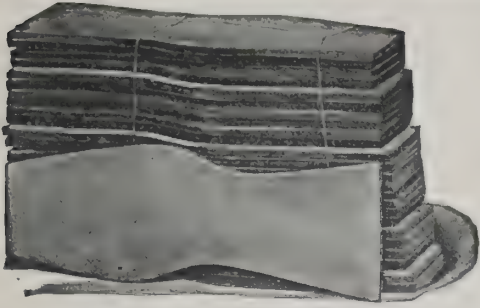
### Some Large American Banks.

THE *Financier* lately printed a page diagram showing some of the largest banks in the country, in the matter of deposits. The minimum deposit in the table is \$5,000,000 and the maximum \$35,000,000, the National Park Bank heading the list. The First National Bank of Chicago occupies a prominent position. We print the figures instead of the diagram:

National Park Bank, New York.....	\$35,000,000
National City Bank, New York.....	33,000,000
First National Bank, Chicago.....	27,000,000
Chemical National Bank, New York.....	26,000,000
Chase National Bank, New York.....	26,000,000
Hanover National Bank, New York.....	24,000,000
American Exchange National Bank, New York.....	19,000,000
National Bank of Commerce, New York.....	17,000,000
Manhattan Company, New York.....	16,000,000
Merchants' National Bank, New York.....	14,000,000
Western National Bank, New York.....	14,000,000
National Bank of the Republic, New York.....	13,000,000
Third National Bank, New York.....	10,000,000
Corn Exchange Bank, New York.....	9,500,000
Metropolitan National Bank, Chicago.....	9,500,000
Continental National Bank, Chicago.....	9,500,000
National Bank of the Republic, Boston.....	9,500,000
Mercantile National Bank, New York.....	8,500,000
Merchants' National Bank, Chicago.....	8,500,000
Shawmut National Bank, Boston.....	8,500,000
Seaboard National Bank, New York.....	8,000,000
Chicago National Bank, Chicago.....	7,500,000
Merchants' National Bank, Boston.....	7,500,000
National Bank of the Commonwealth, Boston.....	7,500,000
National Bank of Redemption, Boston.....	7,500,000
Commercial National Bank, Chicago.....	7,000,000
National Bank of North America, New York.....	7,000,000
Third National Bank, Boston.....	6,500,000
Lincoln National Bank, New York.....	6,500,000
Exchange National Bank, Boston.....	6,500,000
Continental National Bank, New York.....	6,500,000
Corn Exchange Bank, Chicago.....	6,500,000
United States National Bank, New York.....	6,000,000
Bank of the Metropolis, New York.....	6,000,000
Second National Bank, New York.....	5,500,000
First National Bank, Philadelphia.....	5,500,000
Revere National Bank, Boston.....	5,000,000
Gallatin National Bank, New York.....	5,000,000
National Broadway Bank, New York.....	5,000,000
Anglo-California Bank, San Francisco.....	5,000,000
Globe National Bank, Boston.....	5,000,000

—The American Steam Packing Company, 60 Federal street, Boston, Mass., report that their foreign trade so far for 1897 is much in advance of any previous year. They have recently made two large shipments to Africa.





American shoemakers and shoe-menders have got ahead of you. They don't buy whole sides of sole-leather now.

A shoemaker wants 2 or 3 grades and 4 or 5 thicknesses.

We cut sides, make 8 grades and 15 thicknesses, sell the cobbler the grades he wants, and the rest, including the waste, to somebody else, who wants that.

All well served; no waste; no using leather because you've got it.

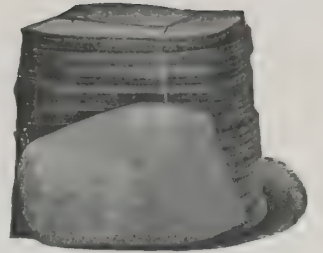
We do this business better than anybody else—it is a close wholesale business.

Do you want to know about it?

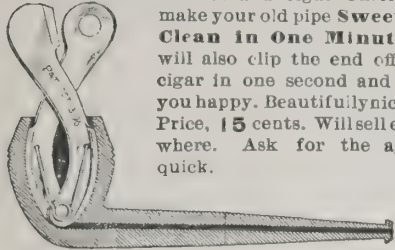
BAXTER SCHENKELBERGER & CO.,

350 Congress street, Boston, U. S. A.

50 Tabernacle street, London



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Our **DIAMOND** Steel Combination Pipe Cleaner and Cigar Cutter will make your old pipe **Sweet and Clean in One Minute**. It will also clip the end off your cigar in one second and make you happy. Beautifully nicked. Price, **15 cents**. Will sell everywhere. Ask for the agency quick.

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One for every man who shaves himself. Just to introduce our Diamond Steel Hand-Forged Cutlery, Knife Sharpeners, Skate Sharpeners, Scissors Sharpeners and Household Specialties into every home on earth.

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**DIAMOND CUTLERY CO.,**

60 Broadway, NEW YORK CITY, U. S. A.

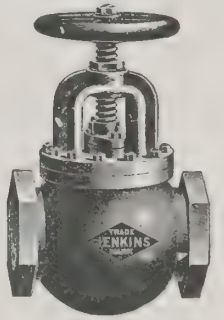


## JENKINS BROS.' VALVES

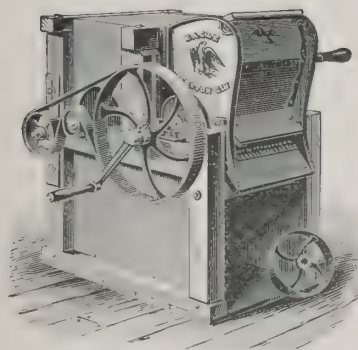
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Are manufactured of best steam metal, and are suitable for any pressures of Steam, Oils or Gases. Contain Keyed Stuffing-Box and Disc Removing Lock-Nut, making them the easiest and cheapest to keep in repair. The Jenkins Discs used in these Valves are manufactured to stand High Pressure Steam. Warranted as represented. None genuine without Trade Mark. Send for Catalogue.

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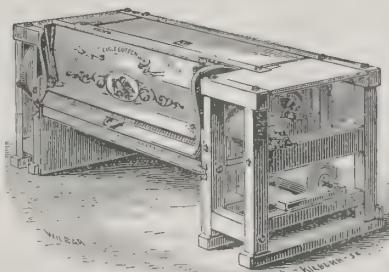
## EAGLE COTTON GINS.



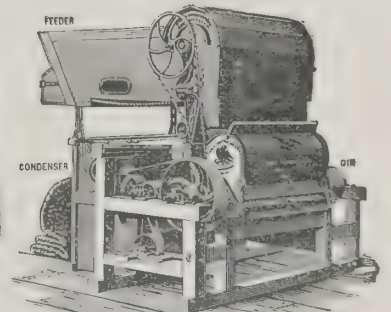
These Gins enjoy a **BETTER REPUTATION** THAN ANY OTHERS OF THEIR CLASS IN EXISTENCE, and are **PREFERRED** to all others made, on account of their **STRENGTH, SIMPLICITY, DURABILITY**, the amount and **EXCELLENCE** of the work they accomplish, and the **RAPIDITY** of their operation.

For further details, illustrated Catalogues will be furnished on application.

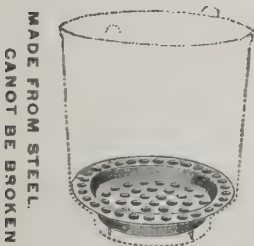
**Eagle Cotton Gin Co.** { FORMERLY Bates, Hyde & Co. } **Bridgewater, Mass.**



Power Gin with 12-inch Saws.



Power Gin with 10-inch Saws, with Feeder and Condenser.



## SAFETY KETTLE BOTTOM.

Prevents Meats and Vegetables from burning while cooking. Can be used for various purposes, either as Steamer, Broiler, Toaster, etc.

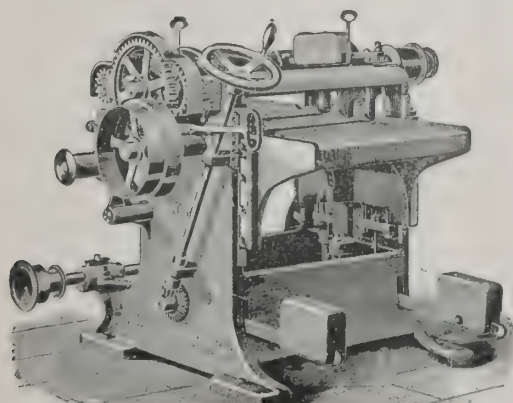
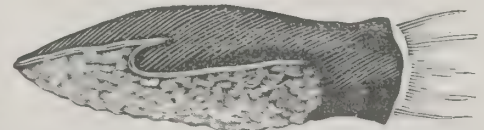
## Stove Polishing Mitten,

FOR BLACKING AND POLISHING A STOVE.

It is one of the most valuable articles ever introduced in the household. Keeps the hands clean. Every woman will appreciate it after one trial. Easily fits the hand, has a waterproof back, and the whole front is made of the most durable and soft sheepskin, tanned with the wool on, superior to all others. With each mitten we give a dauber. By using the Stove Polishing Mitten, blacking a stove ceases to be dirty and disagreeable, which every lady dreads; for in the old way she knows it will take twenty-four hours to get the blacking out of her finger nails. But our mitten does away with all that, for she can make her stove shine like a mirror, and in one minute go to the parlor, entertain company, make bread, or sit down and sew on the finest white goods, **without a speck of blacking on her hands.**

\$18.00 per gross F. O. B. at New York.

For Particulars address **DIAMOND HARDWARE CO., 620 Atlantic Ave., Boston, Mass., U. S. A.**



No. 93. Panel Planer, 24 inches wide, 6 inches thick. Weight, 2,000 lbs.

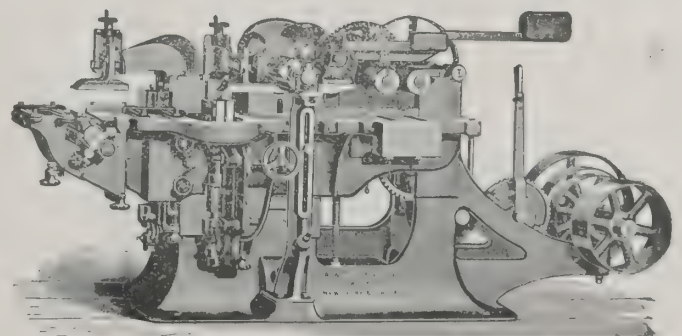
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Correspondence solicited.

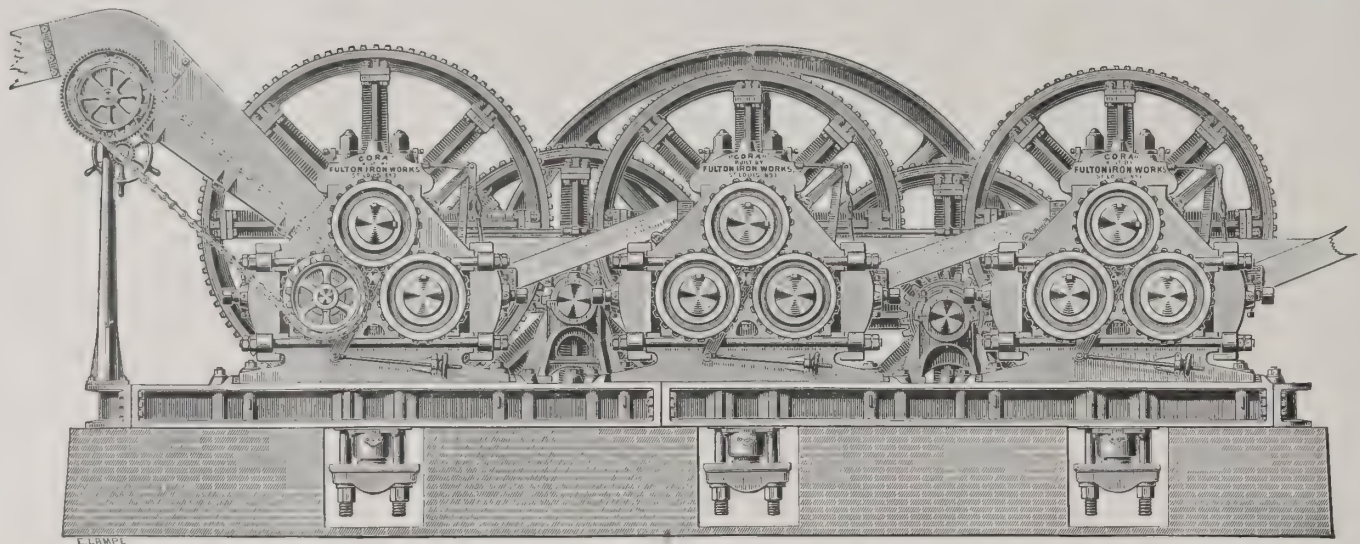


No. 130. Outside Moulding Machine. Works 4 sides, 7, 8 or 9 inches wide. Weight, 3,000 lbs.



# "CORA" Nine-Roller Cane Mill.

CORRESPONDENCE SOLICITED.



ESTIMATES FURNISHED.

Built by **"FULTON IRON WORKS,"** St. Louis, Mo., U. S. A.

Per S.S. "COPTIC"

FULTON IRON WORKS, St. Louis, Mo.

HONOLULU, H. I., June 17th, 1895.

Dear Sirs: The nine-roller mill and Corliss engine built and erected for us by you last year has given perfect satisfaction, and we take pleasure in furnishing you with the following report covering work performed by it during the season just closed. Days grinding, 104 $\frac{3}{4}$ ; Tons of cane ground, 61,617.928; Tons of cane ground per day, 588.238. Extraction: 92.49 per cent. total sugar; 82.13 per cent. of cane; Dilution, 7.91 per cent.; Fibre in cane, 11.02 per cent. Average load on hydraulics, 313.2, 334, 344.5 tons.

It is hard to say just what is the capacity of this mill, as our boiling house is not of sufficient size to admit of a prolonged test, but we would say that we have ground on a short run over 50 tons of cane per hour, and with an increase of from 50 to 75 tons in the load on the hydraulic obtained an equally good extraction. We believe we have the best mill on the Islands.

Very truly yours,

EWA PLANTATION CO.,

E. D. TENNEY, Secretary.

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KENDALLVILLE, IND., U. S. A.

Manufacturers for Export.

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Galvanized Steel Star Back Geared Wind Mills,  
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Iron Pumps, all kinds, furnished either Painted or Galvanized,  
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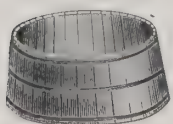
Tubular Well Tools and Machinery,

including Hand Machines, Horse-Power  
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Hydrants and  
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Galvanized Steel Substructure  
Work of all kinds.



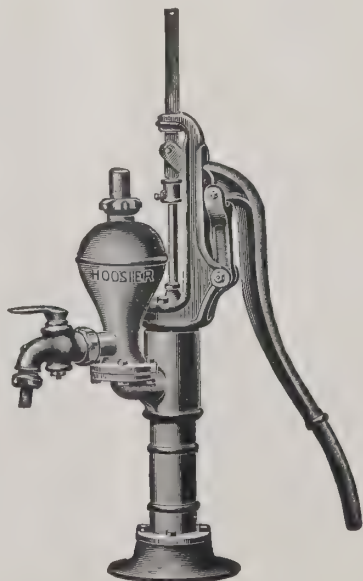
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## MAST, FOOS & CO.

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MANUFACTURERS OF

## IRON TURBINE WIND ENGINES.

**STRONG and  
DURABLE.**

Has stood the test in every civilized  
country on the globe.

**RUNS IN A LIGHT WIND.**

**BUCKEYE**

**Senior Lawn Mower,**

MADE IN

10, 12, 14, 16 & 18 inch Cut.

**STRONG, DURABLE,  
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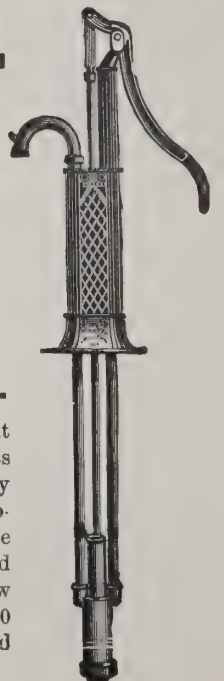
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ALL OTHER  
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in use. Never freezes in winter. Send for Circulars and  
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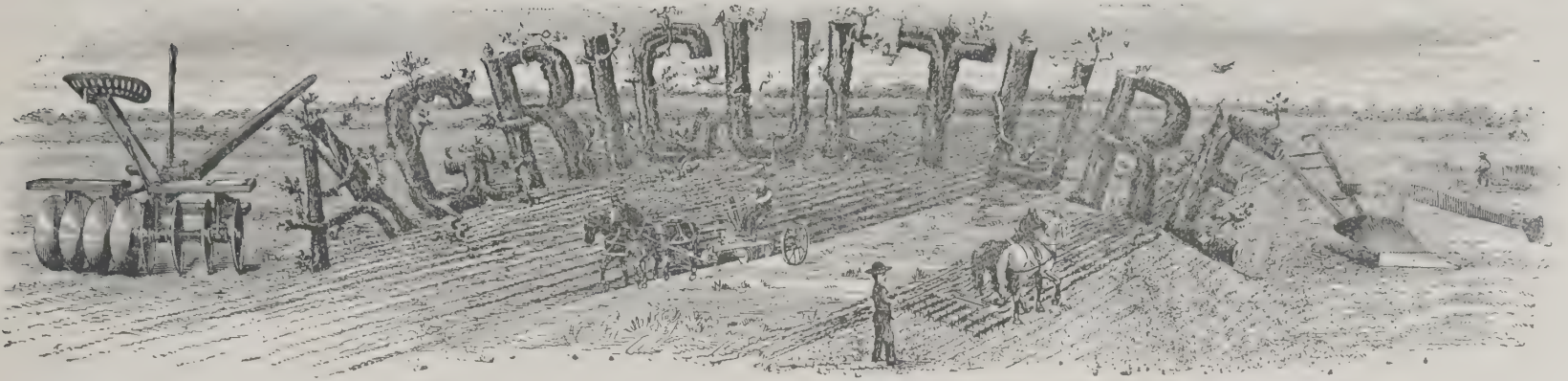


**Buckeye Force Pump.**

Works easy and throws a constant  
stream. Has Porcelain-lined and Brass  
Cylinders. Is easily  
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Pump in the World  
for Deep or Shallow  
Wells. Over 300,000







DEVOTED TO THE FOREIGN TRADE IN AGRICULTURAL MACHINERY AND IMPLEMENTS

### American Exports.

THE New York *Journal of Commerce*, in commenting upon the large export of American manufactures noted during the recent past, raises the question whether these exports will continue under a protective tariff. It declares that "to infer that the foreign markets are merely outlets for a congestion of production, and are to be regarded less as advantages than as mitigations of disaster would be to take too narrow a view of the conditions surrounding our production." The question is asked whether it is "better that high wages shall be received by a small number of workmen, or that 10 per cent. of their wages shall be cut and employment be given to one half more, or perhaps to double the number."

The question may be asked in return whether the latter supposition is quite fair. Is it true, for example, that the exports of the last year have been so large that more workmen are now employed in American industries than were employed in 1892, for example? The general impression is that the change in tariff conditions threw a large number of American workmen out of employment. Possibly the inference was a mistaken one, but the workmen themselves, who presumably know something about the matter, seem to have come to the conclusion that they were adversely affected by the tariff of 1894, and it is largely because of that belief that the Democrats were so signally defeated in the election of 1896.

It is not expected that any serious change will be made in the duties upon iron and steel in the Dingley tariff. If the large exports of iron and steel products in the recent past are not continued it will only be because the manufacturers can find a more profitable market at home. If iron manufacturers or any other manufacturers can pay their employees good wages, and sell their product profitably abroad as well as in the home market, the tariff will not put any obstacle in their way, unless it proves that some article of American production is protected against a competition which has prevented the payment of fair wages in that industry.

### Direct Shipments.

AGERMAN export firm, says the New York *Commercial Bulletin*, has within two months bought in this market a considerable amount of agricultural implements for shipment to Chili from Hamburg. They say that their customers in Chili call for American made goods, and as they can obtain favorable freight rates from here to Hamburg and thence to different Chilean ports, they have figured out that they can in the long run save their customers time and expense by making the shipments that way. "Direct shipments," they continued, "from here to Chilean ports are only made about once a month, while from Hamburg they are almost certain of a steamer about every ten days. Our last good sized shipment was made on the steamer Armenia. We shipped in agricultural implements and some specially made machinery more than \$20,000 for reshipment to Chili. Shortly we shall have a lot of hardware and some agricultural implements to go the same way."

### Quick Processes.

THIS is emphatically a day of quick processes in almost everything, as compared with old methods of doing things. We are living in a fast age. It is a time of telephones, electric cars, and lightning express trains. Man must be heard now a long distance off and be heard at once. If he wishes also to go far away, rapid transit will place him there while he is eating his breakfast, taking a smoke and reading the morning paper, or playing a game of whist. Space is pretty well annihilated to-day by steam and electricity. When the maximum of speed in these and many other things will be reached it is difficult to predict.

There are many things done now "while you wait." There are many other things to be done for which it is rare that you can find persons with patience to wait until they can be done as they should be.

The incubator has taken the place of the old hen toward bringing her numerous and happy brood into the world, and she can now go on her way rejoicing or "scratching for a living," relieved of the old, tedious six-weeks process of starving herself about to death in keeping her nest of eggs warm long enough to hatch, hopping off only a sufficient time to get a swallow or two of water and a kernel or two of grain. Good old hen! they have almost got so as to do without her, but not quite! (It seems we hear her now cackle, "Thank

you. Thank you.") They hatch her eggs for her while she lays more; they make "eggene" for cooking purposes, while she keeps on laying; they make eggs, shells and all on while she continues to drop the old kind in the nest. But they cannot make an egg that will hatch; so her henship is safe yet from the inroads of modern invention.

The months once required to tan a hide into leather for boots are now about reduced to days that you can count on the fingers of either hand, with the product made up and the boots on your feet into the bargain! And probably it will be only a few days more before you will need another new pair to keep your toes in until they get well enough "to be out around!"

White lead can be produced to-day and a passenger coach made and painted with it all through (if any lead is used at all in the process) and finished in less time than our fathers would have thought the lead could have been corroded by the "old Dutch process"—*Implement Trade Review*.

### Cottonseed.

THE British steamship Scottish Hero arrived at Velasco, Texas, on the 18th ult. and took out a cargo of 900 tons of cottonseed meal for Europe, furnished by the Velasco oil mill. The American Cotton Oil Company, of New York, it is reported, has decided to establish two new mills in Texas the coming season, in addition to the 105 mills now owned and operated by the company in the United States. The total foreign exports of cottonseed oilcake and meal for the year 1896 from the port of Galveston, Texas, amounted to 136,648 tons, valued at \$2,967,879, against 105,736 tons, valued at \$2,117,218, for the year 1895. Exports of cottonseed oil for 1896 amounted to 1,936,499 gallons, valued at \$493,794, and for 1895 the exports were 678,766 gallons, valued at \$236,208.

### Reckoning Time Simplified.

THE news comes from Paris that the former Assistant Secretary of the Colonies, Deputy Etienne, intends at the next meeting of the French Chamber to offer a decimal subdivision of time for universal adoption, as described in the Philadelphia *Record* some time ago. The day is divided into 10 hours, the hour into 100 minutes, and the minutes into 100 seconds, making 1,000 minutes, or 100,000 seconds per day.

The hour hand always points in the direction of the sun. Consequently, as the day begins and ends at midnight, the hour hand points downward, as also do the minute hand and second hand, at the exact time of the change of day, or 10 o'clock. Thence it rises with the sun in its apparent motion around the earth, points to the zenith at noon, after which it descends until it reaches its extreme lower point again at midnight. Thus the hour hand makes but one revolution around the dial each day. It is then the figure X on the dial at which the hour hand commences and ends each day, the minute hand each hour, and the second hand each minute.

The time indicated by the decimal clock is always positive time. While 6 o'clock A. M. is represented decimally by 2:30 o'clock, and 6 o'clock P. M. is represented by 7:30, noon is represented by 5 o'clock, and midnight by 10 o'clock. It provides a standard time for the entire globe. It is proposed to divide the terrestrial globe into 1,000 degrees of longitude, corresponding with the 1,000 minutes of the day, and by grouping them into 20 sections of 50 degrees each, establish standard time for the whole world.

Giving to Greenwich, where the counting of the meridians begins, the midnight meridian, and making it 1,000 degrees, the 20 sections would all be reckoned east of Greenwich and all the way round the globe. It is said that this decimal system of time originated in America, being the invention of a United States citizen, although probably the French will be the first to recognize and adopt it.

—The culture of olives in California has increased so rapidly that the State now has a monopoly of the market of this country. The crop last year netted \$250,000 to the growers, but this year it is estimated the output will yield \$3,000,000. The reason for the expected great increase is that a great number of orchards bear this year for the first time. It takes seven years to bring an orchard to profitable bearing. Properly tended the trees continue to produce for centuries.

—It is reported that the N. O. Nelson Company, St. Louis, has shipped to Mr. J. Robertson, Monterey, Mexico, 22 carloads of pump machinery, pipes and supplies for the Monterey Water Works.



# ELECTRICAL NEWS.

## Electricity Direct from Coal.

IN a recent lecture before the Electrical Society meeting in Columbia College, New York, Willard E. Case, a young electrician, showed that the extraction of electrical power from coal without the intervention of heat was at least a possibility. Following is the process as described by him:

"We have made a glass jar containing two electrodes, one of platinum and one of carbon immersed in a solution of dilute sulphuric acid, into which is passed peroxide of chlorine, an explosive gas, which gives up its oxygen to the carbon, oxidizing it without heat and producing electricity direct. The product of the oxidation is carbonic acid gas. The electrometer force of the cell is about 1.3 volts, depending on the kind of carbon used. The gas contains oxygen in loose combination and gives it up readily to the carbon, so oxidizing it, just as the blood gives up its oxygen to the tissues in the human system and oxidizes them, producing work."

What does this mean? It means that the enormous and costly furnaces and boilers of the Atlantic liner can be dispensed with when the new system has been developed.

### SAVING IN STEAMSHIPS.

The most valuable part of the ship which is now occupied by the steam-generating apparatus will be made available for cargo and passengers, while nine tenths of the room now given up to coal will be saved.

A little lump of coal weighing two-tenths of a pound can be made by Mr. Case's method to yield as much energy as the best electric plants to-day secure from five pounds of coal. By his new chemical process a lump of coal weighing one pound will produce exactly five horse power for one hour.

That means that the Campania, a vessel of 30,000 indicated horse-power, would need, according to this new system, about three tons of coal per hour to drive her at her present speed, or seventy-two tons of coal per day. As a matter of fact, the Campania at the present time consumes about 350 tons of coal per day, securing precisely the same amount of energy, heat and light therefrom that she would extract from seventy-two tons of coal under this new system.

The Campania now burns about 2,450 tons of coal on a seven-day voyage. If her screws were driven directly from electric batteries into which the coal had been thrown, and her massive furnaces and boilers entirely dispensed with she would need only 504 tons of coal on a seven-day voyage. This would mean a saving of 1,946 tons of coal, which, at \$5 per ton, would amount to \$9,700 saved on a single voyage, while the saving of room would amount to almost as much again.

### A POUND OF COAL.

This is but one illustration of the enormous economy which may be secured by the discovery of Willard E. Case. Mr. Case has estimated that one pound of coal will run sixty ordinary incandescent electric lights for one hour, according to his new system.

The same lump of coal thrown into one of the batteries devised by him will light an incandescent lamp for sixty hours. This is at least 90 per cent. more light than the same one-pound lump of coal can be made to produce according to the present wasteful methods.

"All electrical experts agree," said Mr. Case, after his lecture, "that at present the waste in the transmission of energy from coal amounts to at least 90 per cent. This energy is lost mainly in heat. The amount of heat which a steam engine wastes has been calculated with mathematical accuracy, and, relatively to the amount which is utilized, it is enormous. There is absolutely no such waste in the method which I have illustrated before the Electrical Society."

"A thermometer applied to the apparatus used by me at various stages of the experiment has shown that there was no heat whatever. Every bit of energy in the coal was extracted and put into the most convenient form for utilization—that is, electricity—which can be made to furnish power, light or heat. Practically all of the electricity now used in commerce the world over is secured from coal through steam power, with the consequent loss of 90 per cent. I simply drop a lump of coal into a battery and immediately take off the electricity, and this, turning a wheel, will yield 90 per cent. more power than if the same amount of coal were burned to produce steam to drive an engine that in turn would drive a dynamo. It is a short cut to the same result."

Mr. Case was asked if the new system, the success of which he had demonstrated on a small scale the previous evening, could be expanded so as to utilize it in place of the engines now in use. He replied that there was no mechanical difficulty in the way.

"Any chemist," he says, "will see at once how the results are secured. I wish, however, to call attention to the fact that the gas employed is an explosive one. This gas any chemist or electrician will know how to handle with safety, but an ignorant boy might do himself injury in endeavoring to extract the full potential energy from coal."

Hitherto the only known method of securing energy from carbon by a chemical means has been through a galvanic battery, but the zinc is so expensive as to make this method impracticable as a substitute for steam.

### SOME EXPERIMENTS.

The inventor explained to his audience at Columbia that he had succeeded in doing with carbon what the galvanic battery does with zinc, carbon or coal being very much cheaper. He then attached the wires from his cell to an electric bell, and as soon as he had dropped in some powdered coal, the bell began

to ring. This showed that the energy of the coal was doing the work. The wires were then unfastened by Mr. Case and attached to an electric fan. The fan flew around with lightning speed.

Mr. Case performed an amazing experiment. He demonstrated that the chemical apparatus he has devised will extract force from blood just as well as it will take it from coal. He exhibited a large test tube containing a solution of haemoglobin from the blood of an ox. Holding the test tube up to the light Mr. Case showed that it was of the color of arterial blood, being fully oxidized. Then he added a reducing agent (a substance that absorbs oxygen) to the blood and excluded the air from the tube by means of a rubber cork. The contents of the tube took on the color of venous blood. Mr. Case then pulled out the cork, admitting the air, and the blood then took in the oxygen and assumed the arterial color again. The lecturer explained that this was precisely what happened with the blood in the human body, and that the experiment might be performed again and again. Every time the reducing agent was introduced the blood in the tube changed color, and when the cork was withdrawn it resumed its original hue. Mr. Case utilized this test tube as a miniature cell. The two wires leading from its electrodes he connected with an electric bell. The energy from the blood was transmitted over the wires, and when it rang the bell there was enthusiastic applause. Connected with an electrometer the force of the current could be measured.

Mr. Case then explained that in this novel battery the carbon was completely oxidized at normal temperature by oxygen held in loose combination.

## The New Fluorescent Lamp.

THOMAS A. EDISON has been working for a long time to produce a new form of electric lighting and he believes that now he is on the right track with his fluorescent lamp. The greatest feature of the discovery is that light can be produced without heat.

In all other forms of lighting there is tremendous loss of energy in heat. Edison says that only 2 per cent. of the total power in gas is turned into light. The other 98 per cent. passes off in heat. With incandescent lamps only 20 per cent. is given off as light, while in the new fluorescent lamp at least 75 per cent. of power is turned into light.

The inventor has figured out that the best incandescent lamp requires 138-foot pounds of energy per second for each candle power. The new lamp requires but 39-foot pounds. Therein lies its commercial value.

"An invention is nothing without commercial value," said Mr. Edison. "Many men invent, but it is the ability to give practical application that requires brain and genius."

In the early stages of his experiments with X rays he found that when a ray struck a crystal of tungstate of calcium it was changed into a soft and brilliant light. He continued working to simplify the mechanical part of the apparatus and perfect the bulb coated with the mysterious crystals. The labor has been crowned with much success and the fluorescent lamp, the wizard believes, is destined to be the light of the future. This is the story written by himself of the discovery:

"Edison's experiments with chemical crystals are not alone for the improvement of the fluoroscope, but for other experiments among which is his fluorescent lamp for giving light by fluorescence."

"One of the practical applications of the X ray by Edison was the production of a lamp which he named the fluorescent lamp. This consists of a glass bulb to the inner surface of which is fused crystals of tungstate of calcium, giving the bulb the appearance as if frosted. The bulb, when connected to an ordinary X-ray apparatus, produces the X ray within it, but in attempting to pass through the glass the ray is met by the crystals of tungstate of calcium."

"The X rays are absorbed by these crystals and their nature changed to ordinary light. In other words, the crystals have the property of changing the X ray waves into ordinary light waves."

"The fluorescent lamps give from two to three candles each. The light is pure white, and there being an almost total absence of heat the economy is astonishing. Of the total power in a gas jet only 2 per cent. is turned into light, 98 per cent. going off as heat. In the incandescent light only 20 per cent. is given off as light, whereas with the fluorescent lamp more than 75 per cent. is given off as light."

## Electric Cabs in New York.

THE appearance of electric hansom cabs upon the streets of New York has attracted much attention. These cabs differ from the usual hansom in that they have four wheels instead of two, and an extension for the batteries. The batteries are contained in this rear compartment, upon which the driver's seat is mounted, and consists of four sets of cells, weighing together about 1,000 pounds.

The steering is effected by a lever which the driver handles with his right hand. With his left hand he controls the current by operating a small hand wheel. The break is operated by foot, as is also the whistle. Two motors of the Lundell type drive the front wheels by means of spur gearing.

All the wheels are provided with heavy pneumatic tires. The front pair are fixed, the cab being steered by the rear wheels. The rear axle is also fixed, but to permit of steering the rear wheel hubs are hollow and are provided with ball joint journals, so that they move independently of the axle. The side lights are small incandescent lamps, and a lamp is also provided on the inside of the cab.

The cabs have a maximum speed of fifteen miles per hour, which is found to be more than necessary to meet all the requirements of city and country.



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No. 6. New Western Cultivator.  
No. 7. Flying Dutchman Gang Plow.

No. 8. Flying Dutchman, Jr., Sulky Plow  
No. 9. Moline Champion Corn Planter.  
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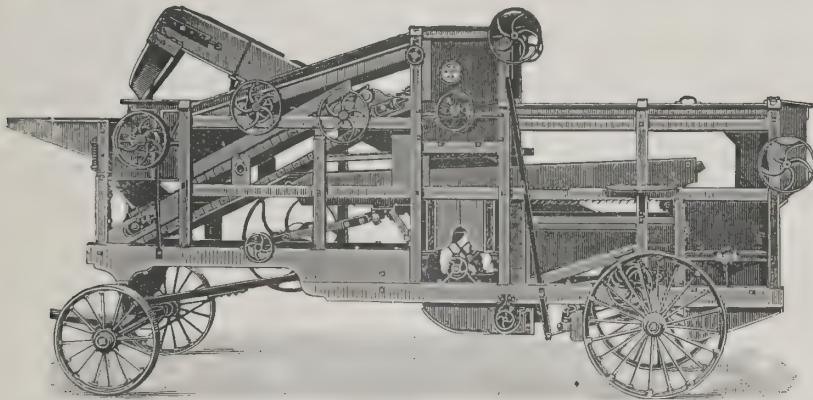
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travel, although, in case a greater speed is called for, it can be had up to a rate of twenty or twenty five miles per hour, but, of course, only at the expense of the total distance which the vehicle can travel. The vehicles have a maximum mileage on one charge of battery of about twenty five miles, depending largely on grades and surface conditions to be overcome.

The cost of operating, with properly equipped stations, is said to be about one-half that of horses. That is to say, assuming that on an average it costs about \$1 per day to keep a horse, including the life of the horse, the cost of operating one of these vehicles capable of doing the same amount of work as a horse will not exceed 50 cents per day. As the size of the battery at present used only has a capacity of eight horse-power hours the cost of charging, where power is produced at the station, should not exceed 2 cents per horse-power hour, or 16 cents, and when obtained from central station 5 cents per horse-power hour, or 40 cents. To this, of course, must be added 10 per cent. depreciation per annum, chargeable to battery renewal, etc.

One of these cabs is employed by Proctor's Theatre for advertising purposes and an electric delivery wagon built by the company will shortly be put in service by a large New York dry goods house.

This cab was built by a company organized expressly for the manufacture of electric vehicles of this and kindred kinds, and having its factory and headquarters in New York.

### Electrical Burglaries.

IN recent experiments an arc of 40 to 50 volts, with a current of 300 to 500 amperes, penetrated in three to ten minutes safe walls 3 to 6 inches thick. As a demonstration of the masses of metal which could be operated upon a rough steel ingot, perhaps 6 by 7 by 10 inches, was penetrated by a diagonal jagged hole from  $1\frac{1}{2}$  to  $3\frac{1}{2}$  inches in diameter, the thickness of metal pierced being about 8 or 9 inches.

What construction can resist this concentration of heat? The hardest steel is penetrated as easily, even more easily, than the softest iron, while the cast metal used in the heretofore invulnerable safes melts and runs like water, making, from its very nature, an easier safe to open than those built of the rolled metal, which, as is well known, remains plastic under a high degree of heat and has not the tendency to flow from the arc and leave an entirely unobstructed passage. In penetrating the wrought iron or mild steel it was frequently necessary to allow the arc to play on the semi-plastic mass being melted to keep it from congealing and preventing further progress. This took a somewhat longer time. The cast safes, owing to the fact that the metal was necessarily designed to flow, in order that the safe could be cast from the pattern, did not resist the arc nearly as long for a given penetration. The metal readily flowed, and a hole large enough to permit the safe to be opened was quickly made—this without undue noise or ought to give warning.

But what type of alarm would or could prevent the gnawing of a hole in the safe plates by the devouring arc? The answer lies in a recently published invention for constructing prison doors and window gratings. The idea, as remembered, was to make them of ordinary steel pipes, all filled with a liquid under pressure, and connected by a main pipe with an alarm which would operate by reduction of pressure. Attempted sawing lets the liquid escape and rings the bell. If such a scheme were applied to a safe, by transversing it on all sides, either inside the outer plate or outside, and were connected with an alarm set on a lamp post prominent on the sidewalk, it ought to come near being good protection.—*Electrical Review*.

—An electrical company will soon make a shipment to England valued, they claim, at \$95,000. Some of this apparatus, it is said, is for an isolated lighting plant which will be erected at Liverpool early in March.

—Over 300 patents have been taken out for non refillable bottles, but so far none have been a commercial success. No reward has been offered for such an invention, and it is doubtful if it would pay unless they were produced very cheaply.

—Mathematical calculations show that an iron ship weighs 27 per cent. less than a wooden one, and will carry 115 tons of cargo for every 100 tons carried by a wooden ship of the same dimensions, and both loaded to the same draught of water.

—\$200,000,000, according to Sir John Pender, is the sum that has been laid out in ocean telegraphic cables. At the present moment there are eleven cables across the Atlantic, belonging to five companies, and these alone have cost nearly \$75,000,000.

—European exchanges say that the reports received from the French forces in Madagascar regarding the aluminum utensils taken by the troops sent to that island have been extremely favorable. The mess tins and other articles used resisted all changes of temperature, and also the action of sea water, while in point of weight there was an immense saving.

—The Buffalo Street Railway Company employs about forty eight-wheeled cars, and, according to the *Street Railway Review*, the different officers of the road say that this type of car has many advantages over the four-wheeled car, and that it is the intention of the company to make this type of car a standard on the entire system. The present cars are being built over and spliced so that the new bodies shall be from 27 to 30 feet in length. It is claimed by the master mechanic of this system that less repairs to the trucks, motors, car bodies and line work are required with the long cars than with the four-wheeled trucks, and it is also thought they are less destructive to the rail joints, while there is no question that they are more popular with the public.

### A Giant X Ray's Photo.

ACCORDING to the New York *Herald*, Dr. W. J. Morton, the pioneer in X ray advancement in this country, has planned to make an experiment that will be literally the biggest thing ever attempted with the mysterious light. Heretofore the photographs taken by means of the X rays have been of sections of the human body only. Dr. Morton now purposes to photograph the whole framework of a man at one time.

The nearest that he, or any one else, ever got to this ambitious undertaking was when, a few weeks ago, he took a photograph of a small boy which comprised almost the entire anatomy, and made a picture thirty four inches in length. Compared with the photograph of a full-grown man, however, this was mere child's play, although it surpassed any previously attempted.

The difficulties in the way are only appreciated by those who have seen the rays in operation. The size of the photograph taken is regulated by the size of the tube in which the light is generated, and the size of this tube in its turn is regulated by the strength of the coil through which is forced the electricity that generates the light.

If a force of electricity is turned into the coil that is too powerful for its strength it would simply mean the wrecking of the apparatus in the same way that a gun of light calibre would be ripped asunder if fired with a charge of gunpowder intended for a piece of heavy ordnance. It would, of course, be possible to photograph the entire body by taking it in sections, but this would make a very patchy picture and would be no novelty in X ray experimentation. Dr. Morton's plan is to take the whole body at "at one shot," as a photographer would express it.

It will be necessary for him, in the first place, to have a tube of sufficient size to hold a light the spreading rays of which will cover an area sufficiently large to take in the whole human body. This tube will have to be four times the size of the largest at present in use.

Then will come the difficulty of securing a coil of sufficient strength to resist the immense electrical force that must be directed through it to generate the giant rays. It would be practically impossible for Dr. Morton to secure this in his own laboratory, unless he turned his house into a factory and built dynamos of sufficient force to run a railroad. He has got over this difficulty, however, by enlisting the services of the dynamos of the electric power house in West Twenty-sixth street. The current used in the forthcoming experiment will be obtained from the electric wire that passes close to the Doctor's house, and back of the current will be the big dynamos of the power house.

The monster coil necessary for the experiment has already been made. It only remains to secure the tube in which the light is to be generated, which tube will have to be made with the greatest care, for much of the success of the experiment depends upon it being flawless.

Apart from the X ray difficulties, there is the additional one of securing a film large enough to take a photograph of such a size as the one proposed. This film will have to be especially made, and will be one of the costliest items in the outfit.

Whether or not the apparatus will accomplish the end desired, even with the greatest care in its construction, remains to be seen. The X ray contrivance is so delicate in its construction, so little is really known about the new light, and so many unlooked-for contingencies are liable to happen in focusing the rays upon so large a surface as a man's entire frame, that many failures may be expected before a successful photograph is secured.

Should the experiment be a success it may or may not result in a benefit to science. Like the effort to find the North Pole, it is undertaken for no other reason than that it has never been accomplished and has not been thought possible of accomplishment. The fact that it is treading dangerous ground to try experiments with such a comparatively unknown quantity as the X rays only lends zest to the attempt, and there is always a possibility that something advantageous to science may come of it.

Dr. Morton has not decided upon what date he will make the experiment, but it will not be delayed longer than a few weeks, in which time it is expected that the new apparatus will be completed and placed in position for use. The doctor intends to make a minute and careful report of the experiment to the world through one of the electrical journals. It will be a stride forward in X ray knowledge that will be welcomed by the reading public, and the result of the experiment will be watched with interest.

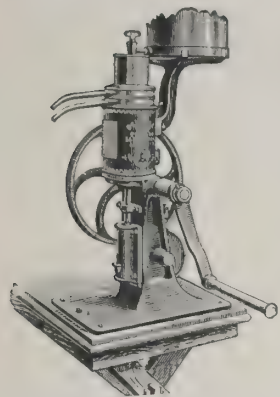
### Alabama Iron.

IN a recent public statement James Bowron, treasurer of the Tennessee Coal, Iron and Railroad Company, states that the foreign business of the company is the largest part of its transactions. Alabama iron is now shipped to England, Holland, Belgium, Germany, Spain, Italy, Austria, India and Japan, and negotiations are under way for shipments to Russia, Australia and South Africa. The aggregate exports of Alabama pig iron for the period from July 1st last to February 1st amounted to 92,000 tons.

—The first test of some new fire helmets of aluminum, which were manufactured for experimental purposes for the New York City Fire Department, was made lately at a large downtown fire. The battalion chiefs wore these helmets and expressed themselves as much pleased with them, principally because they are light and do not soak up the water. The old leather helmets are heavy in themselves and, when wet, weigh several pounds. It is reported that all the men of the New York Fire Department are, as a result, to be supplied with aluminum helmets.



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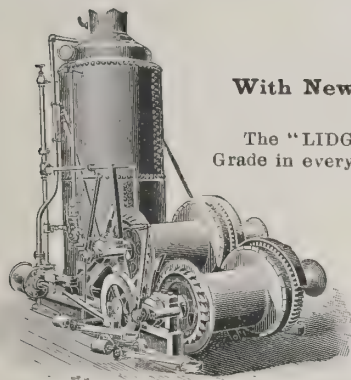
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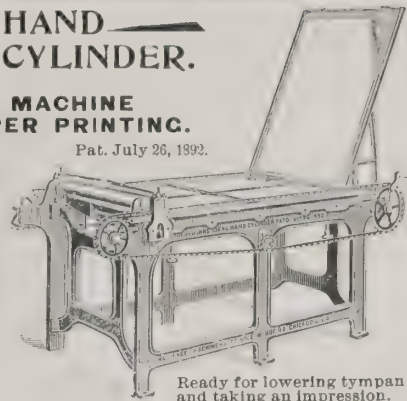
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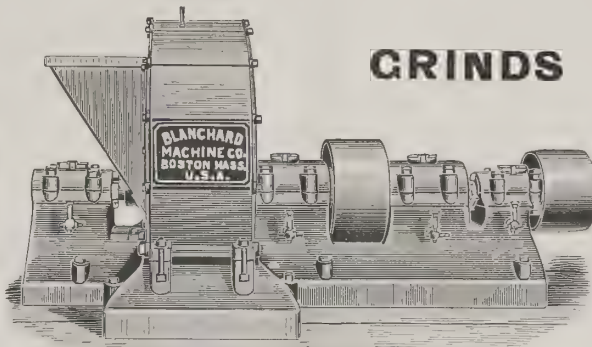
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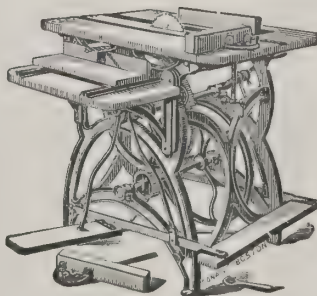
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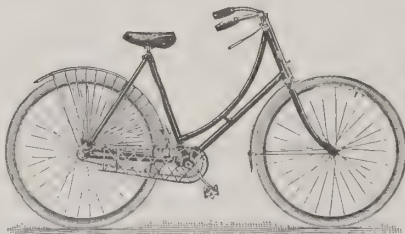
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Price \$100. Weight 23½ lbs.

This is our standard men's wheel and is suitable for all kinds of road use. It is built in three heights of frames, 22½, 24 or 26½. The wheels are 28 inches diameter; 26 inches will be furnished if preferred. Gear, 68; options, 60, 63, 72, 73 or 80; cranks, 6½ inches, 7 inches if preferred. If not otherwise specified, all machines will be fitted with Hartford or Morgan & Wright tires. All wheels are supplied with tool bag, tools and repair kit. Regular finish, black enamel, nickel trimmings. If a lighter wheel than the above is desired, order should specify Model 21, which will weigh with light road equipment about 20½ lbs.

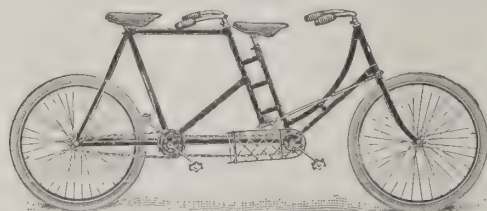
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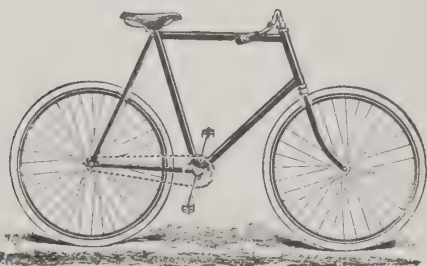
Our ladies' wheels are built in three heights of frames, 20½, 22½ or 24 inches. 20½ inches is standard and will be shipped if not otherwise specified. Wheels, 28 inches, can be furnished, with 26 if preferred. Regular gear, 63; options, 56, 60, 68 or 72; cranks, 6 inches throw. The weight is about 24 lbs.

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### A Reconnaissance with Bicycles.

AN EXPERIENCE of great interest to cyclists is that recorded by Lieut. Abercrombie of the 2d United States Infantry in the *Army and Navy Journal*. In obedience to a special order from Col. J. C. Bates, Post Commander at Fort Omaha, Neb., the Lieutenant started with Sergeant George Schofield and Corporal Gustaf Lundquist on a bicycle reconnaissance to Chicago on June 10, 1896. For five weeks before the start was made the three men went into arduous training for the expedition, riding from twenty-five to seventy-five miles a day. To carry equipment, consisting of a half-shelter tent, one change of underclothing, one revolver and rations, spare chain, two pedals, two tires, cement, etc., a leather knapsack fitting the diamond frame of the bicycle was procured. With a blanket rolled up and tied to the handle-bars the weight of the machine and equipment was brought up to fifty pounds per man. When the reconnoitring party left Fort Omaha the roads were in wretched condition from heavy rains. Nevertheless eighty-six miles were made the first day. Where bridges had been carried away by flood much time was lost in felling trees and throwing them across for a footway. The soldier-cyclists were sore and tired at the end of their day's riding, but "it would have been simply impossible," says Lieut. Abercrombie, "for a horseman to have made the trip in any length of time, even if the animal could have been gotten over the streams where the bridges were out, because he would have mired down before he reached the bank, and then the current was so swift that he never could have made a landing."

The second day a rain storm drove the wheelmen to the railroad tracks. Determined not to lose time, the lieutenant and his men bumped along over the ties, not dismounting even when they came to trestles. "The vibration of the handle-bars at times where the ties were a little more than the regulation distance apart," he says, "was terrific. It was remarked by each member of the party that, had their opinion been asked as to whether a machine could be ridden loaded over such a road, they would have said positively no; and as I look back now at the ride I can scarcely realize that such a delicate-looking machine as a bicycle could withstand such rough usage." Nine miles an hour was the pace kept up over the ties. For some miles out of Tama, Ia., on the third day the road ran through deep sand, and much to their disgust the soldiers were obliged to walk and push their machines. "The people resident in this section of Iowa," says Lieut. Abercrombie in a side note, "appeared to be utterly devoid of any knowledge of the topography of the country more than five miles from their abodes, and they live on the most wretched food it was ever my unhappy lot to eat." On the sixth day ninety-nine miles were covered, the route lying through Southwestern Illinois, the last fourteen being made over hilly roads in sixty-five minutes. This feat gives one an idea of the quality of these military cyclists. It must be remembered that the weight of the machines as dressed was fifty pounds.

At 11 A. M., June 17th, the reconnoitring party reported at Gen. Wesley Merritt's headquarters at Chicago, having ridden 588½ miles in seven days "over an average road as rough as it was possible for rain and sun to make it." "On my arrival," says the Lieutenant, "I found that the constant jar over the rough roads had about used up my forearms, and as we had made the trip in twenty hours less than the professional record and in three days less time than it was expected, I rested until the 20th." The return trip was made over better roads and without accident. In all, the distance ridden was 1,142 miles, at an average rate of 88 a day, the reconnaissance lasting thirteen days—a record from which Lieut. Abercrombie concludes that he could pick out fifty men from the 2d United States Infantry capable of riding 1,000 miles in ten days over ordinary country roads. He believes, therefore, that the bicycle is indispensable as an aid to campaigning. As a means of transportation it is valueless, he holds, only in sand devoid of vegetation and in soft, unpacked snow. This piece of advice, the result of four years of experimenting, he gives to wheelmen: "The load must be carried as near the ground as possible." On the subject of dust-proof bearings he reports: "I selected a mechanism that depended on the accurate adjustment of the parts to cause by the rotary motion of the wheel a constant minute flow of oil from the interior. This forms a coating of fine grit

and oil on the outside, which acts as a barrier and keeps the bearings free from dust and decreases the friction enormously." In the ride to Chicago his bicycle ran so easily that he did not think the bearings required inspection. When examined at Gen. Merritt's headquarters they were free from grit and dust. Lieut. Abercrombie does not tell us whether the rims of the bicycle he rode were of wood or steel, or what its weight was when stripped. But it may be inferred that, expecting heavy travelling, he selected a machine with steel rims weighing without equipment twenty-eight or thirty pounds.

### Friends of the Bicycle.

THERE was a time, not so very long ago, when the bicycle scarcely had a friend in the crowd. Now most of the crowd are riding bicycles, and the steel of steel has friends by the score everywhere.

This condition was clearly foreseen by those who had given the bicycle a proper, intelligent test, and had learned of its beneficent properties. The only remarkable feature of the result is that its conquest of all classes and conditions of people has been so rapid and so complete.

The newspapers no longer consider it a matter of news when a judge or a mayor or a governor or a prominent divine "takes to the wheel." The pulpit has, paradoxically, shown strong opposition to and extreme friendliness for the wheel. Those who have not insisted the bicycle is carrying everybody to ruin have asserted their belief to be that all its paths lead to Paradise. A few have occupied middle ground, but most preachers have felt the bicycle's influence to be so important and far-reaching that they have declared themselves for or "agin" it.

For a time the bicycle was an experiment when considered in a wholesale, public way. Now that it has been fairly tested by all the people, it is found to be a good thing when properly used. The pulpit has come to believe that there is a place for the bicycle to fill. It is now pretty generally believed that a minister of the Gospel may ride a bicycle and yet be a fairly good sort of a man.

Where "the pyramids themselves, dotting with age, have forgotten the names of their founders," this latest and most ingenious of man's handiwork greets the earliest and least useful product of his engineering skill. It is the least artificial of all means of locomotion that have ever been given to the human race. Its operation affords the maximum of man and the minimum of mechanism. It is nature perfected by art—an art that has not subjugated man to the machine but has made of science a mechanical tonic for the upbuilding of humanity.—*Law Bulletin*.

### Self-Inflating Tire.

THE information conveyed in the following account of the wonderful properties of a newly invented tire may not be correct, but it is vouched for by an English contemporary: Instead of the usual endless tube which is common to all or most detachable tires, a piece of tubing of about half the diameter and twice the length is employed. This tube is coiled twice around the wheel in a direction opposite to that of its rotation, and each of the two ends tapers to a point, where it is sealed.

These ends overlap each other to the extent of the tapering, and so fill up the space. A valve of the ordinary kind is fitted near one end of the inner tube, and the first coil occupies a position in the hollow of the rim. This part of the tube is thinner and of smaller diameter than the other half, which is coiled outside of it and is situated immediately beneath the tread of the tire. An outer cover of ordinary character and attachment is used.

The automatic inflating is performed as follows: If the tire is empty or has little air in it, the weight of the rider and the machine compresses the tubes more especially the bore of the thinner part lying in the rim, to the end of which the valve is attached. This part is flattened under the pressure, and as the wheel goes around the pressure travels along it, leaving behind a vacuum into which the air flows through the valve. This operation goes on until the tire is fully inflated, being renewed at every revolution of the wheel. The ingress of air follows the flattening of the tire, making the inflation of the tire an automatic process.—*Implement Trade*.



### Bicycle for 1897.

THE following description of the bicycle for this year was published by one of the papers representing that trade: "The frame of the new machine is, of course, of diamond shape, with the top bar practically horizontal. The greatest differences which may be noted are in the size of the tubing used and in the rake of the head and rear stays. Nearly all makers have adopted the  $1\frac{1}{8}$ -inch tube for the main tube, and most of them are using the same size for the lower tube.

"The tread of this year's machine is generally in the neighborhood of 5 inches, although some manufacturers make it smaller than that, and in the racycle, owing to its peculiar construction, the tread is reduced to  $3\frac{5}{8}$  inches in the racer. But there does not seem to be as much general demand for narrow treads this year as there was last.

"The chief characteristic of the frame of 1897 lies in the fact that flush joints have become of very general use. These are of many kinds and designs, and nearly every manufacturer has one which he considers the best.

"The sprockets are now nearly all of the detachable variety. As to crank shafts, many manufacturers have the right crank and spider permanently joined with the shaft, and the left crank fitted over the end of the shaft. The rims this year are being made entirely of wood and a little wider. Oil holes are not favored in '97 machines, and softer padded saddles are coming in. Gear cases are in demand, though charged extra. Handle bars are preferably of steel, though wood is used, and present a more finished appearance than last year. Gears at about 70 will be popular with men, and 64 with ladies. Many machines have the cones permanent, with the adjusting done by moving the cups closer to the cones. More wheels will be enamelled some other color than black. Some cranks will be 7 inches, although  $6\frac{1}{2}$  inches is the standard."

### Large Tires.

BICYCLE makers say there will be a great many 2-inch tires fitted to machines next season. There are only a few superintendents who do not anticipate being put to the necessity of constructing bicycles with sufficient clearance in the rear forks for the reception of unusually wide tires, some even going to the length of predicting that the bulk of tires next season will be of  $1\frac{3}{4}$ -inch diameter. Many, however, still cling to the belief that  $1\frac{1}{8}$  inch tires will, as this year, be in strongest demand. However the public taste may turn, it is certain that the bicycle makers are, by the use of D-tubing, prepared to accommodate tires of any reasonable width. The fact is very evident that a bicycle fitted with narrow tires is much more severely affected during the course of a season's service than one fitted with fat tires; bearings are not so liable to be racked, the frame joints are relieved of considerable vibration, riding is made easier, speed is not sensibly decreased and liability to puncture is not increased. For country road riding there is nothing so easy and comfortable as large tires. One of Chicago's well-known riders, who weighs over 200 pounds, intends going to the extreme limit, for he has ordered a machine with  $2\frac{1}{2}$ -inch tires.—*Industrial World*.

### A New Style of Street Car.

THE double-decked vestibule street car is the newest proposition in the development of electricity as a motive power. It is designed by the Pullmans and is being manufactured at their works in Chicago.

The most novel feature to the public is the second story, which will make street travel delightful in pleasant weather. From a mechanical point of view the distinctively novel feature is the vestibuling in the middle of the car. On the roof at each end is a cab for the motorman, accessible through the vestibule and stairways. The car has no end platforms, entrance and exit to the car being effected through the vestibule.

This type of car possesses some noteworthy advantages. Draughts through the car are avoided, and by means of automatic devices pleasant and healthful circulation of air is obtained. The upper seat feature is a very attractive one, affording, as it does, every facility for enjoying the sights of city streets and delights of country scenery.

The question of cost, of course, is an important one with the railway companies. It is claimed that the saving in first cost will amount to more than 50 per cent. on the car equipment of the road, the calculation being based upon the relative cost and carrying capacities of the different types of cars. The carrying capacity of one of these cars is eighty passengers.

Besides this item of economy it is claimed that the electrical equipment for a centre vestibule car seating eighty passengers will cost at least one-third less than for two ordinary cars seating only seventy-two passengers. The percentage of earning capacity of one of these cars is said to be greater than that of two ordinary cars, and the vestibule car is so much lighter per passenger seated as to effect a large saving in power.

THE EDWARD P. ALLIS COMPANY, of Milwaukee, Wis., has recently made large shipments of machinery to Europe and South Africa. During March this company shipped to Trieste, Austria, two blowing engines for the equipment of a new blast furnace smelting works. The shipping weight of each engine was over 500,000 pounds, 30 cars being required to carry them to the seaboard. The value aggregated about \$80,000. This company is making extensive sales of engines and air compressors in South Africa. A recent shipment to Johannesburg embraced three engines of 1,200 horse-power each, for use in an electric power plant in the South African city.

### Hard Times.

"HARD times come again no more!" Pshaw! we all sing it, but do we know what hard times are? We sing it while we eat beefsteak, oysters and three kinds of bread at the same meal; we shout it while we smoke cigars; we think of it while we comfortably stretch our legs on Brussels carpets before a blazing grate, with well dressed sons and expensively clad daughters around us. We groan it while we read our morning and evening papers; we dream it in our soft, springy beds; we shout it through our telephones, and ring the changes on it as we take our Summer outing or run "centuries" on \$100 bicycles.

Hard times! bewails the finely clad wife as she elbows her way along the bargain counter.

Hard times! moans the clean-shaven husband as a press of the button sheds the electric light over his at home friends—and yet in these days we don't know what hard times are.

We think we do—but we don't. The writer is reminded of papa's remembrances, where, in one of the richest parts of this great country of ours, that a whole town of some 2,000 inhabitants possessed less than \$500 in money.

All exchange was by barter. Among the best and richest families beefsteak was a once a-week visitor, round beef a luxury, oysters an unheard-of dainty; corn bread was the usual; the cheap pipe tobacco was a dissipation; cold bed-rooms, scant wood fires, calico then what silks are to-day; 6x8 window panes were helped out by hats, rags and old papers; a weekly paper was an extravagance and served two families; ingrain carpets scarce and Brussels not heard of.

Beds were slatted or corded, and the sole vacation was a ride (not over brick pavements) to the annual picnic in the one-horse shay.

The men worked from sun-up to sunset—the women worked all the time. Do any of our readers recall those days? Yet it is doubtful if there was in those days such a universal spirit of unrest and discontent, such a concert of growling—as to day. Is it fair? Are we grateful? Can we afford to waste time in bewailing the slowness of prosperity when fate is so easy with us?

Let us put aside these ugly tempers of ours—smile at the shadows—all sunshine makes the desert. Look toward the sun; drink in its beauties, and talk and think business confidence. Let us shut our eyes to trouble, and if all would do so times would be good.—*D. M. Johnson in State Register*.

THE *Carriage Monthly* says: "Our American exports of bicycles for 1896 are given at \$2,500,000, the larger share of which has gone to Great Britain. These figures are wholesale prices. The American bicycle exhibit at the Stanley show has given our wheels a send-off—if they needed any—that will be lasting. American wheels are now a recognized faction. They are seen everywhere in shop windows, the papers have big advertisements about them, and, better than all, American tourists by the horde are introducing them not only in Great Britain, but all over the Continent. Highly paid and thoroughly experienced experts now control the business of selling. The present successes abroad are the sure forerunners of a large export trade.

THE PELTON WATER-WHEEL COMPANY, San Francisco and New York have recently shipped a number of wheels to Japan; also three wheel plants to the Island of Java, East Indies, including pipe lines and all appliances. The former were chiefly for electric lighting and the latter for running the machinery of sugar, tea and coffee plantations, as well as for furnishing light. The company are using as a very interesting letter circular a picture of the surveying work being done by one of their engineers and a gang of native assistants, for a large power station in the Malay Peninsula, not far from Singapore. This plant will furnish power and light for several large towns over transmission lines.

—What is said to be the largest engine ever sent to South Africa has been recently shipped by the Bates Machine Company, of Joliet, Ill. It was 2,000 horse-power, 21x42x60, Corliss compound, and required seven cars to transport it.

—The Philadelphia Engineering Company will shortly ship overland to San Francisco and thence to Japan an immense steel plate smokestack, to equip a large new electric light plant in Yokohama. The stack is a huge affair, being 175 feet high and 7 feet 8 inches in diameter in the clear, and weighing over 90,000 pounds. There are few larger steel stacks in this country than the one for the Japanese plant.

—From recent export statistics it is clear the export trade in American horses is increasing, and foreign prices are advancing. Exports of common and carriage horses in 1893 were 13,707; 1894, 22,866; 1895, 34,092, and for nine months of 1896, 34,642. The strong point of the American horse is his staying qualities. Cab horses sell from \$55 to \$100 for cabs, omnibuses and trucks. Draught horses are in great demand, and latest quotations are for first class, \$250 to \$280.

—One of the latest adaptations of the wood pulp industry, says *Paper Trade*, is the manufacture of shoe heels. The wood is reduced in the usual way, in digesters, after which the pulp is put into a tank and mixed with alcohol, litharge, tar, degreas and fish glue. The pulp is hardened so that it can be rolled into thick sheets and handled, shellac and borax accomplishing this; the pulp then having the consistency of cement. At this point slackened lime is put in and, as this hardens when dry, the pulp must be rolled into sheets and cut into heels before the hardening takes place. The pulp is now drawn from the tank in sheets. A series of pressures through press rollers reduces the sheet to the right thickness, and it is next placed quickly upon the bed of a cutter and shaped into heels.







### Living Photographs.

THE Mutoscope, so named from the Latin *Mutos*, registers a great advance in photography as applied to objects in motion and their reproduction. This little instrument, not unlike a stereoscope in size and general appearance, presents to the eye photographic views of objects in motion in so lifelike a manner as to border upon the marvellous. To illustrate: An express train travelling at the rate of 60 miles an hour is seen approaching, a mere speck in the distance. On it comes! 'Tis here! Going by! Gone!—all with the vividness of reality, and so realistic that it does not require a great stretch of the imagination to hear the roar and feel the breeze it makes. You see clouds of steam, the whirling wheels, and then the vacant track—and you want to see it again.

While the art of recording movement by the camera and the reproduction of the views so recorded, presenting scenes in which the objects appear in motion as in life, is not entirely new, yet it partakes largely of the character of novelty, since but a small percentage of the general public has been afforded an opportunity of becoming at all familiar with the subject, or of even witnessing the marvellous results obtained.

In the operation of the mutoscope the spectator has the performance entirely under his own control by the turning of the crank. He may make the operation as quick or as slow as fancy dictates, or he may maintain the normal speed at which the original performance took place; and if he so elects the entertainment can be stopped by him at any point in the series and each picture inspected at leisure; thus every step, motion, act or expression can be analyzed, presenting effects at once instructive, interesting, attractive, amusing and startling.

The capacity of the mutoscope is coequal with the camera. It reproduces in motion anything which can be photographed, whether motion of human bodies or movements in mechanism or nature. Thus the Falls of Niagara, the eruption of Vesuvius, the harbor of New York with moving ships and water craft, conflagrations, storms at sea, horse and boat races, surf and bathers, moving trains, animals in action, athletic games and sport, scenes from plays introducing prominent actors in favorite rôles—in fact, any scene, from the gigantic down to the motion of an insect, can be reproduced with perfect fidelity to nature and the actual movements presented by the scene, depicted in a most realistic way.

The mutoscope is admirably adapted for many uses. As an advertising device the instrument stands without a rival. Enlarged pictures showing only a few motions of any subject, to be operated by electric or spring motors for window displays, thus bringing into life and motion trademarks which have become familiar to the public eye and memory by extensive advertising, also making known articles and establishments seeking public patronage.

To cite an instance, note the familiar advertisement of Pear's Soap, in which a boy is shown blowing soap bubbles. If this picture were endowed with life the effect would be infinitely more striking.

As an instructor in many lines it is unrivalled; fencing, boxing, dancing, wrestling and all athletic sports and exercises may be taught in the pupil's home. Each thrust, blow, parry, step and movement may be analyzed and studied at leisure.

In the realm of anatomy it will become a living text book, demonstrating the play of muscles and parts either to the medical student or in schools of art, where hundreds of poses may be studied from a model more patient, untiring and versatile than any living subject. The mysterious realms of microscopy offer a wide and wonderful field for the reproduction of live and moving organisms and atoms magnified to visibility under the naked human eye, in fact so many are the studies that the mutoscope can demonstrate that it should find its way into every school and institute of learning as also into the hands of instructors and pupils.

**MECHANICAL DEMONSTRATIONS.**—The most complicated mechanism shown in motion will explain in one minute more than the most exhaustive catalogues, the action of each working part can be followed, analyzed and understood clearly; thus a perfect working plant of the most expensive or bulky machinery can be sent by mail to any part of the world by mutoscopic means at a trivial cost. "A speaking likeness" is what a photograph or portrait is called that happens to catch some natural expression of the subject, but how often one portrait of the same person differs entirely from another every one knows, it being the rare exception to strike the happy effect of a familiar facial expression, the strained rigidity required for a sitting making the result generally unnatural. The mutograph is at its best where there is movement and action, and thus the mutoscope reproduces to us the living, breathing counterpart of the sitter. The smiling, thoughtful or animated features of dear ones can live forever, the family group or circle can be viewed in lifelike movement long after death may have reduced its number and made fixed the original of those features we still behold living in the mutoscope.

Great events of pomp and State, military and civic, can be preserved for future generations. The inauguration of a president, the passing of a parade and other public events can thus be perpetuated in the archives of a government and require only the space of a law book.

The mutograph, the camera which takes pictures shown in the mutoscope, is in itself a wonderful machine. This machine is capable of taking pictures 2 by 2½ inches at the rate of 100 per second, where such rapid work is required by rapidly moving objects.

It is ordinarily operated by an electric motor and storage battery, thereby securing perfect regularity of speed, and an indicator attached to the machine shows at every instant the exact number of pictures being taken per second. Enlargements obtained from selected views so taken are frequently found to be

of great commercial value for trade purposes. For example, a view of an express train travelling at high rate of speed when enlarged makes a most attractive advertising picture. These pictures may also be of great value for press purposes, as much study is often necessary to secure a proper picture with which to illustrate an article.

**THE BIOGRAPH.**—Having once obtained a series of large high-class negatives of any scene by means of the mutographs, these can be projected upon a screen by means of the biograph, and shown in life size or larger. The biograph projects upon a screen a brilliantly lighted picture 20x25 feet in size. These pictures may be produced with all their natural colors.

The biograph has been in uninterrupted exhibition in the city of New York since the night of its first performance, and owing to the character of the show, and the interesting nature of the views displayed, the interest in this wonderful machine continues unabated. The biograph is also so arranged that pictures of different size can be shown in rapid succession: Thus the Falls of Niagara, a public square in New York, or an ocean scene may be shown in the picture 20x25 inches, and may be immediately followed with hardly a second's delay by a picture 8x12 inches, showing Joseph Jefferson in his famous toast scene. The advantage of this is, that while landscape scenes may be shown full size, it is not necessary to show pictures containing human figures abnormally large.

The following scenes will serve to illustrate the character and scope of the views obtained:

**UNION SQUARE, NEW YORK CITY.**—This interesting view shows with striking detail the busy scene at 14th street and Broadway, cable cars and cross-town cars passing in both directions, passengers getting on and off the cars, sidewalks thronged with people, and the streets with vehicles, presenting a true life picture of the heart of New York.

**STABLE ON FIRE.**—This scene graphically portrays the rescuing of the vehicles and live stock from a burning barn. Through a mist of smoke the horses and cows are let out on a run, vehicles are dragged by, and the rush and excitement of such a scene is vividly shown. Smoke effects of this view are particularly attractive.

Mr. Austin P. Nichols, in an article on this class of instruments says:

"Although the principle of the persistence of vision has been known for many years and applied to the production of the illusion of moving pictures, the marvellously delicate and accurate machinery necessary to take so many consecutive photographs of actual scenes from life, and project them properly upon a screen, is the product of the past two or three years. The credit of the invention is claimed by several different persons, but it is probable that it belongs to no single inventor, having been perfected by several working independently, but at the same time.

"At present there is some room for improvement in the clearness and steadiness of the views as thrown upon the screen, but this is simply a matter of mechanical detail which will doubtless soon be attained, and, in combination with the phonograph, the possibilities seem almost endless. Not only scenes and events of historical and world-wide interest, but the very words and tones of the speakers engaged in them, can be recorded and preserved for future generations. Although the vitascope has hitherto been only an amusing toy, it will doubtless in the future prove to be of distinct scientific value, and hold an important place in the education and enlightenment of mankind."

—The total exports of machinery from the United States, as officially reported for the year 1896, amounted to \$25,769,790; for 1895, \$18,062,267. For December, 1896, they were \$2,654,394; for December, 1895, \$2,249,841.

—Extremes meet in the Boston office of the E. Howard Watch and Clock Company, for among the orders received one day last week were a call for bicycles from Finland and another for a lot to be shipped to New Zealand.

—The Ames Iron Works recently closed another contract for electric lighting purposes in the Far East. This time it is for three 80 h. p. automatic engines intended to drive belt-connected arc lighting dynamos, for shipment to Singapore.

—It is not necessary to look at your competitor as an enemy. He is running a friendly race with you, and if he is a better salesman than you, or a better hustler, he will get ahead of you. Give him credit for it and follow in his footsteps.

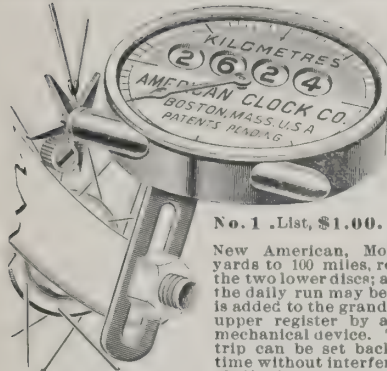
—The Davis & Egan Machine Tool Co., of Cincinnati, have just received a large order from Stockholm, Sweden, for some 40 machines, amounting to about \$22,000; also a large order from Sheriff, Swingley & Co., of Johannesburg, South Africa.

—Mr. E. H. Allen, Hawaiian Consul-General of New York, has been authorized to ask for proposals on 4,140 feet of 12 inch cast-iron water pipe, special castings and pig lead for his Government. Bids are asked from Americans only, and are open at his office until March 15th.

—Experts on the subject are now declaring that blinkers and blinds are not only of no use on horses, but a harm. They help to prevent a horse from knowing where a sound comes from that inspires him with fear. Besides, they are anti-hygienic, because they create a current of air about the horse's eyes at each step, and when standing still, heat is generated, causing more or less disease to the visual organs.

—Advices have recently been received by a prominent merchant interested in Peruvian trade that by the end of this month several gentlemen will reach New York who will be in the market for mining machinery. It is understood that the parties in question have bought valuable property in the mining districts of Peru in combination with English capitalists, and will begin operations as soon as final arrangements are consummated in this city.



**The American Cyclometer.**

Fully guaranteed. Claimed to be the most accurate and reliable made. Registers from yards to 10,000 miles and repeats. All made in Miles and Kilometers. Sizes, 24, 26, 28, 30 inch wheel. Easily read from the saddle. Requires no care. Does not get out of order. Weight, 18-1 oz.

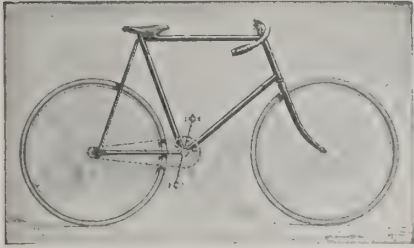
NOTE:  
The Special Century Run Trip registers, as shown in cut of the



No. 3. List, \$1.75. Full size.

No. 1. List, \$1.00.

New American, Model 3, from yards to 100 miles, registering on the two lower discs; and whatever the daily run may be the amount is added to the grand total of the upper register by an ingenious mechanical device. The Century trip can be set back to 0 at any time without interfering with the 10,000 mile register. Electrotypes

on application. Write for discounts. **AMERICAN CLOCK CO., Boston, Mass., U. S. A.****SUPERB—OWEN BICYCLES—SUPERB**

**SUPERIOR** { Design.  
Workmanship.  
Material.

**WE NEVER COPY;  
WE ORIGINATE.**

Easiest running and most perfect bearings in the world.

**THE OWEN OUT-COASTS THEM ALL.**

Write for Catalogue and Terms.

**OWEN MFG. CO., New London, Conn., U. S. A.**

**RED CROSS RUBBER CEMENT.**

The BEST CEMENT in the world for Repairing Pneumatic Tires. For sale by all first-class dealers throughout the world. It has no equal. These tubes are put up in neat and attractive cases, containing one dozen tubes each. None genuine unless it bears our trademark—

**RED CROSS.**

Send for catalogue of Red Cross Specialties. Sample Tube by mail, 25 cents. Ask your dealer for it and take no other. Manufactured by

**ARLINGTON U. BETTS & CO., Toledo, O., U. S. A.**

**NIAGARA BICYCLES.**

AGENTS WANTED.

Correspondence Invited.



GOODS GUARANTEED.

Catalogues on Application.

**BUFFALO WHEEL CO.**

BUFFALO, N. Y., U. S. A.

CATALOGUES will be mailed to all representative dealers all over the world.

DISCOUNTS and TERMS made to you on your application. Lowest wholesale prices given for foreign trade.

SHIPMENTS can be made direct from Chicago to any point in a prompt manner. We secure special transportation rates to lay the goods at your door without any trouble to you.

*Temple*  
**Bicycles.**

The most complete line of Wheels in the world.

PRICES:

**\$100, \$75, \$60, \$50, \$40.**

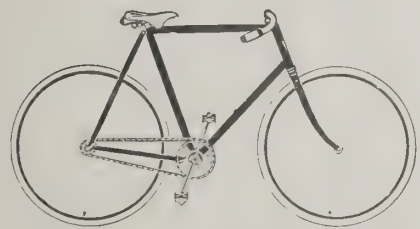
ALL STYLES AND PRICES.  
LIBERAL DISCOUNTS.

Send for our catalogue; it will interest you.

WE DESIRE AS AGENTS those who want good, reliable bicycles of the first grade. Our wheels are made to suit the demand of the FOREIGN TRADE. Correspondence invited. Exclusive agency given.

**RALPH TEMPLE CYCLE CO.**

204 35th St., CHICAGO, ILL., U. S. A.

**Secure Agency for Soudan, Nile and Pyramid Bicycles.**

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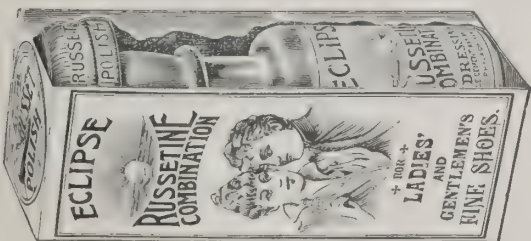
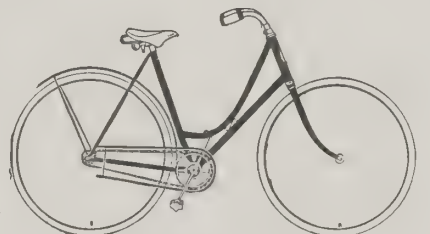
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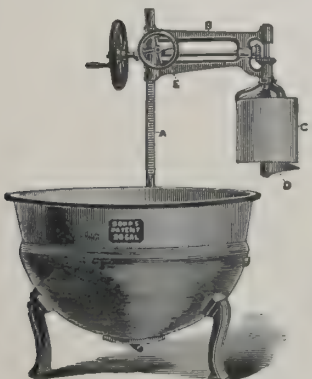
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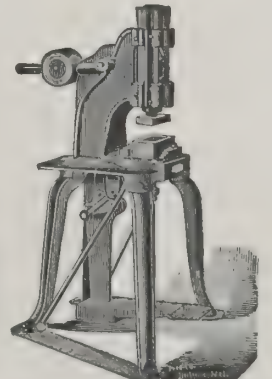


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## FOREIGN WEIGHTS AND MEASURES WITH AMERICAN EQUIVALENTS.

To assist the readers of THE AMERICAN EXPORTER in their correspondence with American manufacturers, we print below tables of weights and measures and their American equivalents:

## FOREIGN WEIGHTS AND MEASURES.

Prepared by the Bureau of Statistics, Department of State, U. S. A.

Denomina- tions.	Where used.	American equivalent.	Denomina- tions.	Where used.	American equivalent.	Denomina- tions.	Where used.	American equivalent.
Almude	Portugal	4.422 gallons.	Fanega (dry)	Chile	2.575 bushels.	Oke	Turkey	2.85418 pounds.
Ardeb	Egypt	7.6907 bushels.	do	Cuba	1.599 bushels.	do	Hungary, Wallachia	2.5 pints.
Are	Metric	0.02471 acre.	do	Mexico	1.54728 bushels.	Pic	Egypt	214 inches.
Arohe	Paraguay	25 pounds.	do	Morocco	Strike fanega 70 lbs.; full fanega 118 lbs.	Picu	Borneo and Celebes	135.64 pounds.
Arratel or libra	Portugal	1.011 pounds.	do	Uruguay (double)	7.776 bushels.	do	China, Japan and Sumatra.	133½ pounds.
Arroba (dry)	Argentine Republic	25.3175 pounds.	do	Uruguay (single)	3.888 bushels.	do	Java	135.1 pounds.
do	Brazil	32.35 pounds.	do	Venezuela	1.599 bushels.	do	Philippine Islands (hemp).	139.45 pounds.
do	Cuba	25.3664 pounds.	Fanega (liquid)	Spain	16 gallons.	do	Philippine Islands (sugar).	140 pounds.
do	Portugal	32.38 pounds.	Feddan	Egypt	1.03 acres.	Pie	Argentine Republic	0.9478 foot.
do	Spain	25.36 pounds.	Frail (raisins)	Spain	50 pounds.	do	Castilian	0.91407 foot.
do	Venezuela	25.4024 pounds.	Frasco	Argentine Republic	2.5096 quarts.	Pik	Turkey	27.9 inches.
Arroba (liquid)	Cuba, Spain and Venezuela.	4.263 gallons.	do	Mexico	2.5 quarts.	Pood	Russia	36.112 pounds.
Arshine	Russia	28 inches.	Fuder	Luxemburg	264.17 gallons.	Pund (pound)	Denmark, Sweden	125 pounds.
Arshine (square)	do	5.44 square feet.	Garnice	Russian Poland	0.88 gallon.	Quarter	Great Britain	8.252 bushels.
Artel	Morocco	1 12 pounds.	Gram	Metric	15.432 grains.	do	London (coal)	36 bushels.
Baril	Argentine Republic and Mexico.	20.0787 gallons.	Hectare	do	2.471 acres.	Quintal	Argentine Republic	101.42 pounds.
Barrel	Malta (customs)	11.4 gallons.	do	do	2.838 bushels.	do	Brazil	130.06 pounds.
do	Spain (raisins)	100 pounds.	Dry	do	26.417 gallons.	do	Castile, Chile, Mex- ico and Peru.	101.61 pounds.
Berkovet	Russia	361.12 pounds.	Liquid	do	1.422 acres.	do	Greece	123.2 pounds.
Bongkal	India	832 grains.	Joch	Austria-Hungary	4 yards.	do	Newfoundland (fish)	112 pounds.
Bonw	Sumatra	7.0665 square metres.	Ken	Japan	2.2046 pounds.	do	Paraguay	100 pounds.
Bu	Japan	0.1 inch.	Kilogram (kilo)	Metric	0.621376 mile.	do	Syria	125 pounds.
Butt (wine)	Spain	140 gallons.	Kilometre	do	216 cubic feet.	do	Metric	220.46 pounds.
Calliso	Malta	5.4 gallons.	Klatfer	Russia	5.13 bushels.	do	Palestine	6 pounds.
Candy	India (Bombay)	529 pounds.	Kota	Japan	35 bushels.	Rottle	Syria	5½ pounds.
do	India (Madras)	500 pounds.	Korree	Russia	85.134 bushels.	do	Russia	7 feet.
Cantar	Morocco	113 pounds.	Last	Belgium, Holland	82.52 bushels.	Salm	Malta	490 pounds.
do	Syria (Damascus)	575 pounds.	do	England (dry malt)	2 metric tons (4,480 pounds.)	Se	Japan	3.6 feet.
do	Turkey	124.7036 pounds.	do	Prussia	112.29 bushels.	Seer	India	1 pound 13 ounces.
Cantaro, Cantar	Malta	175 pounds.	do	Russian Poland	11½ bushels.	Shaku	Japan	10 inches.
Carga	Mexico and Salvador	300 pounds.	do	Spain (salt)	4.760 pounds.	Sho	do	1.6 quarts.
Catty	China	1.333½ (1½) pounds.	League (land)	Paraguay	4.633 acres.	Standard (St. Petersburg).	Lumber measure	165 cubic feet.
do	Japan	1 31 pounds.	Libra (pound)	China	2.115 feet.	Stone	British	14 pounds.
do	Java, Siam, Malacca	1.35 pounds.	do	Castilian	7.100 grains (troy).	Suerte	Uruguay	2,700 cuadras (see cua- dra).
do	Sumatra	2.12 pounds.	do	Argentine Republic	1.0127 pounds.	Tael	Cochin China	590.75 grains (troy).
Centaro	Central America	4.2631 gallons.	do	Central America	1.043 pounds.	Tan	Japan	0.25 acre.
Centner	Bremen, Brunswick	117.5 pounds.	do	Chile	1.014 pounds.	To	do	2 pecks.
do	Darmstadt	110.24 pounds.	do	Cuba	1.0161 pounds.	Ton	Space measure	40 cubic feet.
do	Denmark, Norway	110.11 pounds.	do	Mexico	1.01465 pounds	Tonde (cereals)	Denmark	3.94783 bushels.
do	Nuremberg	112.43 pounds.	do	Peru	1.0143 pounds.	Tondeland	do	1.36 acres.
do	Prussia	113.44 pounds.	do	Portugal	1.011 pounds.	Tsubo	Japan	6 feet square.
do	Sweden	93.7 pounds.	do	Uruguay	1.0143 pounds.	Tsun	China	1.41 inches.
do	Vienna	123.5 pounds.	do	Venezuela	1.0161 pounds.	Tunna	Sweden	4.5 bushels.
do	Zollverein	110.24 pounds.	Litre	Metric	1.0567 quarts.	Tunland	do	1.22 acres.
Chh	China	14 inches.	Livre (pound)	Greece	1.1 pounds.	Vara	Argentine Republic	34.1208 inches.
Coyau	Sarawak	3.088 pounds.	do	Guiana	1.0791 pounds.	do	Castile	0.914117 yard.
do	Siam (Koyan)	2.667 pounds.	Load	England (timber)	Square, 50 cubic feet; unhewn, 40 cubic feet; inch planks, 600 superficial feet.	do	Central America	38.874 inches.
Cuadra	Argentine Republic	4.2 acres.	Manzana	Costa Rica	1½ acres.	do	Chile and Peru	33.367 inches.
do	Paraguay	78.9 yards.	Marc	Bolivia	0.507 pound.	do	Cuba	33.384 inches.
do	Paraguay (square)	8.077 square feet.	Maund	India	82½ pounds.	do	Curaçao	33.375 inches.
do	Uruguay	Nearly 2 acres.	Metre	Metric	39.37 inches.	do	Mexico	33 inches.
Cubic metre	Metric	35.3 cubic feet.	Mil	Denmark	4.68 miles.	do	Paraguay	34 inches.
Cwt. (hundred- weight)	British	112 pounds.	do	Denmark (geograph- ical)	4.61 miles.	do	Venezuela	33.384 inches.
Dessatine	Russia	2.6097 acres.	Morgen	Prussia	0.63 acre.	Vedro	Russia	2.707 gallons.
do	Spain	1.599 bushels.	Oke	Egypt	2.7225 pounds.	Verges	Isle of Jersey	71.1 square rods.
Drachme	Greece	Half ounce.	do	Greece	2.84 pounds.	Verst	Russia	0.663 mile.
Dun	Japan	1 inch.	do	Hungary	3.0817 pounds.	Vlocka	Russian Poland	41.98 acres.
Egyptian wts. and measures.	(See CONSULAR RE- PORTS No. 144.)							
Fanega (dry)	Central America	1.5745 bushels.						

## Metric weights.

Milligram ( $\frac{1}{1000}$  gram) equals 0.0154 grain.  
Centigram ( $\frac{1}{100}$  gram) equals 0.1543 grain.  
Decigram ( $\frac{1}{10}$  gram) equals 1.5432 grains.  
Gram equals 15.432 grains.  
Decagram (10 grams) equals 0.3527 ounce.  
Hectogram (100 grams) equals 3.5274 ounces.  
Kilogram (1,000 grams) equals 2.2046 pounds.  
Myriagram (10,000 grams) equals 22.046 pounds.  
Quintal (100,000 grams) equals 220.46 pounds.  
Millier or tonnes - ton (1,000,000 grams) equals 2,204.6 pounds.

## Metric dry measure.

Millimetre ( $\frac{1}{1000}$  metre) equals 0.061 cubic inch.

Centilitre ( $\frac{1}{100}$  litre) equals 0.6102 cubic inch.  
Decilitre ( $\frac{1}{10}$  litre) equals 6.1022 cubic inches.  
Litre equals 0.908 quart.  
Decalitre (10 litres) equals 9.08 quarts.  
Hectolitre (100 litres) equals 2.838 bushels.  
Kilolitre (1,000 litres) equals 1.308 cubic yards.

## Metric liquid measure.

Millilitre ( $\frac{1}{1000}$  litre) equals 0.27 fluid ounce.  
Centilitre ( $\frac{1}{100}$  litre) equals 0.338 fluid ounce.  
Decilitre ( $\frac{1}{10}$  litre) equals 0.845 gill.  
Litre equals 1.0567 quarts.  
Decalitre (10 litres) equals 2.6417 gallons.  
Hectolitre (100 litres) equals 26.417 gallons.  
Kilolitre (1,000 litres) equals 264.17 gallons.

## Metric measures of length.

Millimetre ( $\frac{1}{1000}$  metre) equals 0.0394 inch.  
Centimetre ( $\frac{1}{100}$  metre) equals 0.3937 inch.  
Decimetre ( $\frac{1}{10}$  metre) equals 3.937 inches.)  
Metre equals 39.37 inches.  
Decametre (10 metres) equals 393.7 inches.  
Hectometre (100 metres) equals 328 feet 1 inch.  
Kilometre (1,000 metres) equals 0.62137 mile (3,280 feet 10  
inches).

## Metric surface measures.

Centare (1 square metre) equals 1.550 square inches.  
Are (100 square metres) equals 119.6 square yards.  
Hectare (10,000 square metres) equals 2.471 acres.

## THE METRIC SYSTEM.

Prepared by the Bureau of Coast and Geodetic Survey, U. S. A.

## ELEMENTS OF THE METRIC SYSTEM.

Length.	Surface.	Capacity.	Weight.	Notation.
Myriametre			Metric ton	1,000,000
Kilometre			Quintal	100,000
Hectometre			Myriagram	10,000
Decametre			Hectogram	1,000
Metre			Decagram	100
Decimetre			Gram	10
Centimetre			Decigram	1
Millimetre			Centigram	0.1
			Milligram	0.01
				0.001

## EQUIVALENTS OF CUSTOMARY AND METRIC WEIGHTS AND MEASURES.

1 kilometre	0.62137 mile.	1 mile	1.60935 kilometres.
1 metre	3.28083 feet.	1 yard	0.914402 metre.
1 centimetre	0.3937 inch.	1 foot	0.304801 metre.
1 hectare	2.471 acres.	1 inch	25.4001 millimetres.
1 are	119.6 square yards.	1 square mile	2.59 square kilometres.
1 metric ton	2,204.62 pounds.	1 acre	0.4047 hectare.
1 kilogram	2.20463 pounds.	1 square foot	9.29 square decimetres.
1 gram	15.43236 grains.	1 pound	0.453 9 kilogram.
1 hectolitre	2.8377 bushels.	1 grain	64.7989 milligrams.
1 hectolitre	26.417 gallons.	1 bushel	0.35239 hectolitre.
1 litre	1.0567 quarts.	1 gallon	3.78543 litres.
1 stère	1.308 cubic yards.	1 cubic foot	0.02832 cubic metre.

## METRIC WEIGHTS AND MEASURES.

Prepared by the American Engineering firm of C. W. Hunt Co., New York, U. S. A.

Millimetres  $\times 0.03937$  = inches.  
Millimetres  $\times 25.4$  = inches.  
Centimetres  $\times 0.3937$  = inches.  
Centimetres  $\times 2.54$  = inches.  
Metres  $\times 39.37$  = inches. (Act Congress.)  
Metres  $\times 3.281$  = feet.  
Metres  $\times 1.094$  = yards.  
Kilometres  $\times 0.621$  = miles.  
Kilometres  $\times 1.6093$  = miles.  
Kilometres  $\times 3,280.7$  = feet.  
Square millimetres  $\times 0.0155$  = sq. inches.  
Square millimetres  $\times 645.16$  = sq. inches.  
Square centimetres  $\times 0.155$  = sq. inches.

Square centimetres  $\times 6.451$  = sq. inches.  
Square metres  $\times 10.764$  = sq. feet.  
Square kilometres  $\times 247.1$  = acres.  
Hectare  $\times 2.471$  = acres.  
Cubic centimetres  $\times 16.383$  = cubic inches.  
Cubic centimetres  $\times 3.61$  = fl. drams.  
Cubic centimetres  $\times 29.57$  = fluid oz. (U. S. P.)  
Cubic metres  $\times 35.315$  = cubic feet.  
Cubic metres  $\times 1.358$  = cubic yards.  
Cubic metres  $\times 264.2$  = gallons (231 cu. in.)  
Litres  $\times 61.022$  = cubic in. (Act Congress.)  
Litres  $\times 33.81$  = fluid ounces (U. S. Phar.)  
Litres  $\times 0.2642$  = gallons (231 cu. in.)  
Litres  $\times 3.78$  = gallons (231 cu. in.)

Litres  $\times 28.316$  = cubic feet.  
Hectolitres  $\times 3.531$  = cubic feet.  
Hectolitres  $\times 2.84$  = bushels (2,150.42 cu. in.)  
Hectolitres  $\times 0.131$  = cubic yards.  
Hectolitres  $\times 26.42$  = gallons (231 cu. in.)  
Grams  $\times 15.432$  = grains. (Act Congress.)  
Grams  $\times 981$  = dynes.  
Grams (water)  $\times 29.57$  = fluid ounces.  
Grams  $\times 28.35$  = ounces avoirdupois.  
Grams per cu. cent.  $\times 27.7$  = lbs. per cu. in.  
Joule  $\times 0.7373$  = foot pounds.  
Kilograms  $\times 2.2046$  = pounds.  
Kilograms  $\times 35.3$  = ounces avoirdupois  
Kilograms  $\times 1,102.3$  = tons (2,000 lb<sup>s</sup>)

Kilogr. per sq. cent.  $\times 14.223$  = lbs. per sq. in.  
Kilogram-metres  $\times 7.233$  = foot lbs.  
Kilo per metre  $\times 0.672$  = lbs. per foot.  
Kilo per cu. metre  $\times 0.026$  = lbs. per cu. foot.  
Kilo per cheval  $\times 2.235$  = lbs. per H. P.  
Kilowatts  $\times 1.34$  = horse-power.  
Watts  $\times 746$  = horse-power.  
Watts  $\times 0.7373$  = foot pounds per second.  
Calorie  $\times 3.968$  = B. T. U.  
Cheval vapeur  $\times 0.9863$  = horse-power.  
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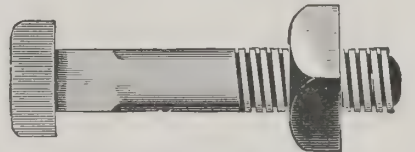
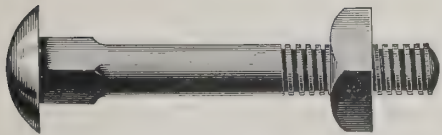
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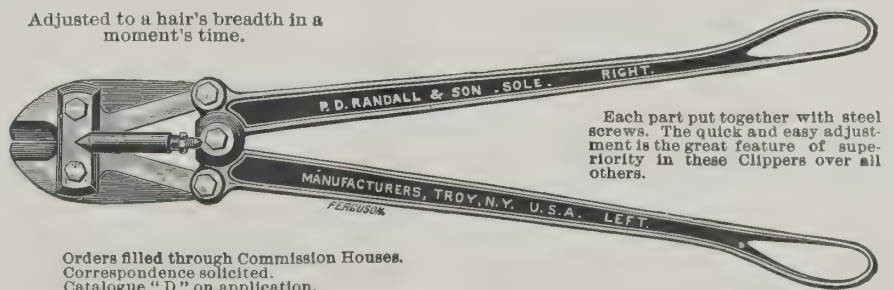
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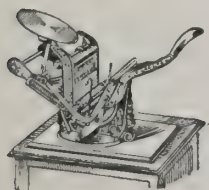
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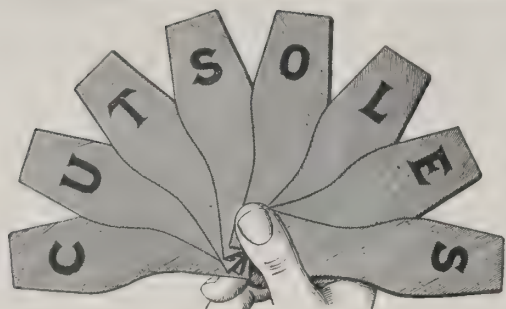
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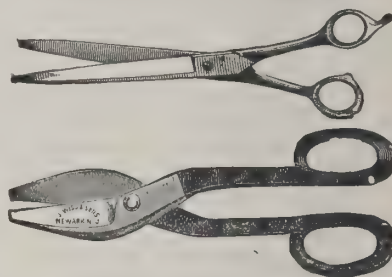
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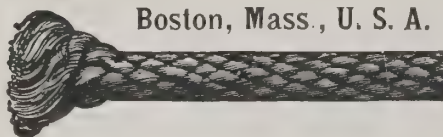
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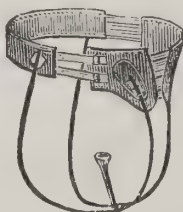
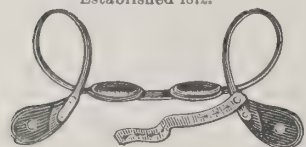
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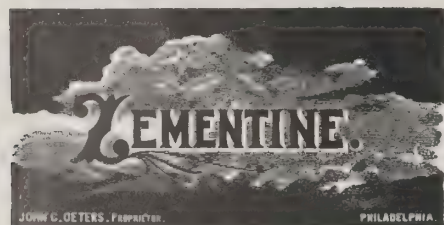
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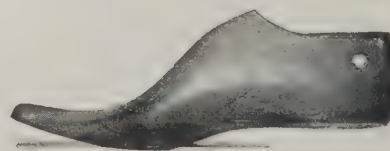
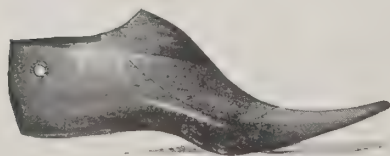
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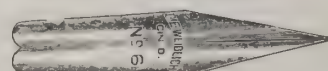
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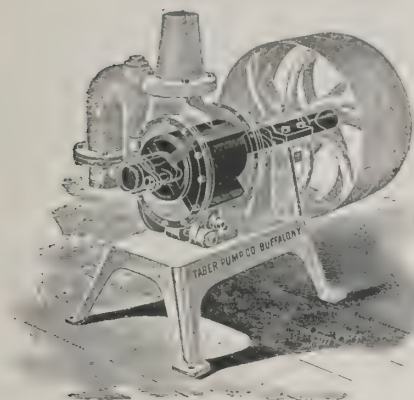
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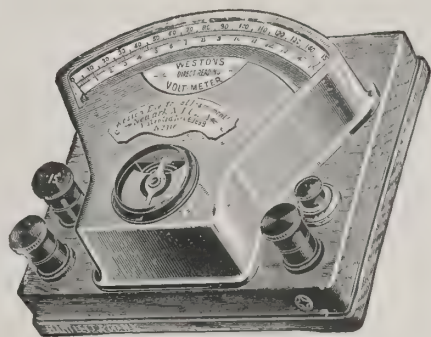
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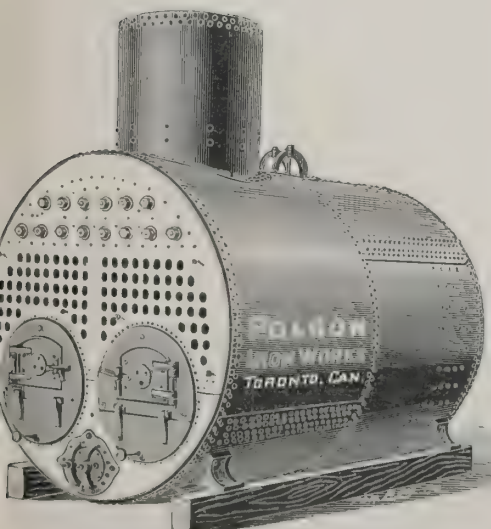
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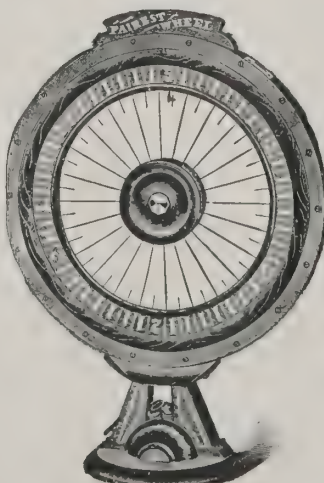
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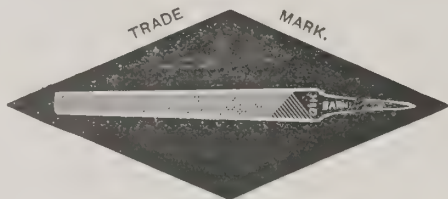
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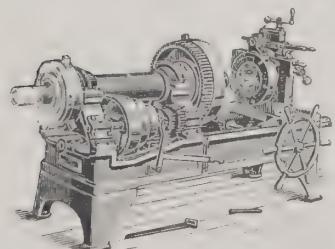
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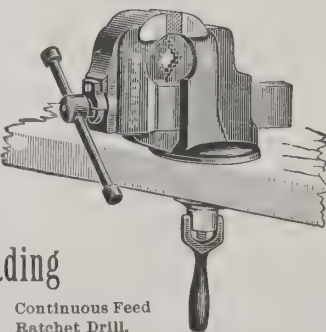
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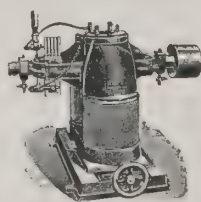
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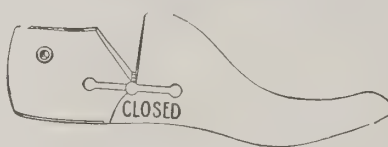
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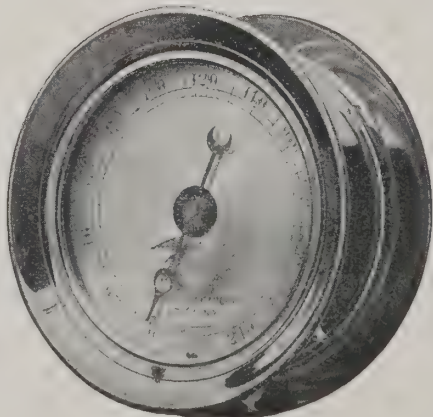
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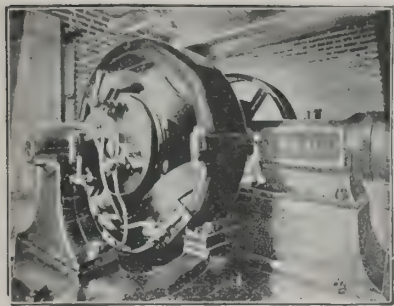
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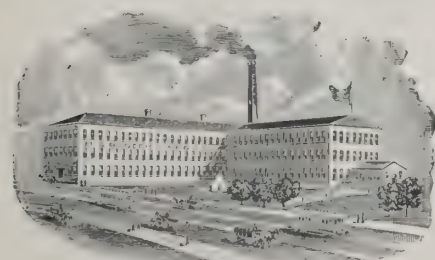
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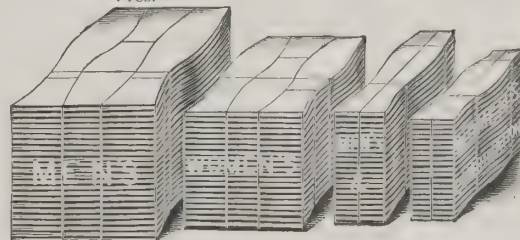
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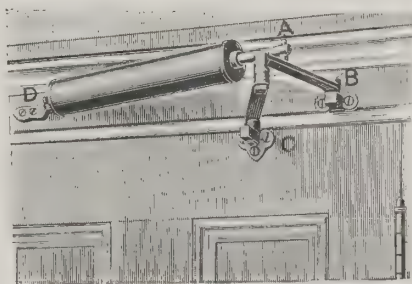
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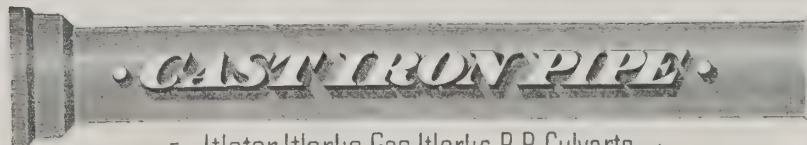
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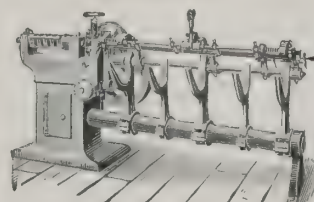
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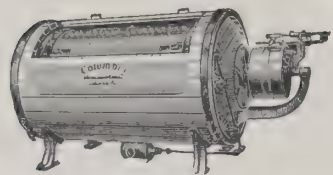
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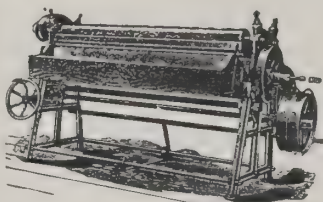
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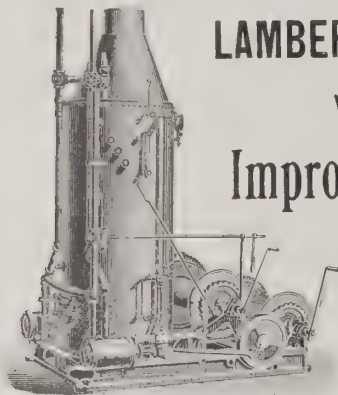
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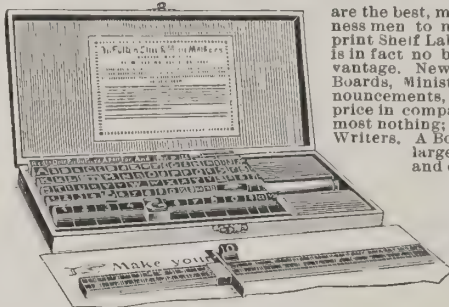
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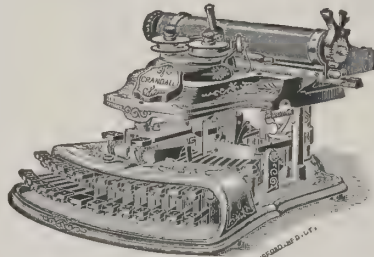
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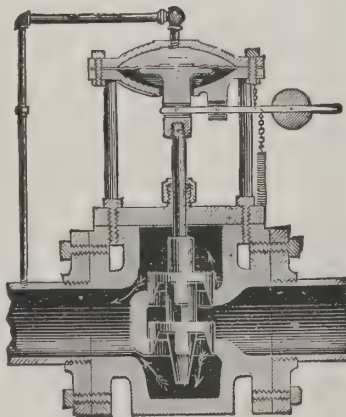
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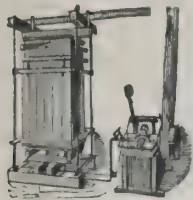
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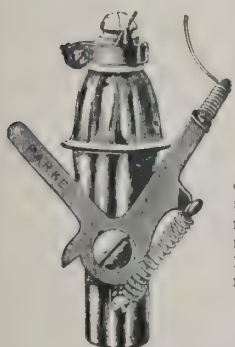
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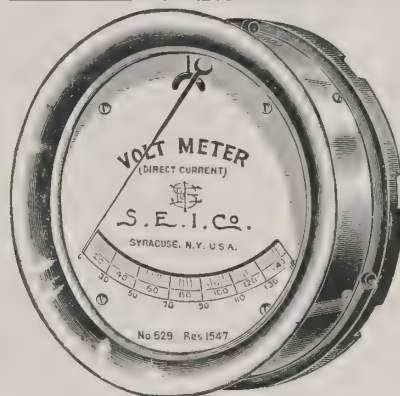
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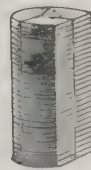
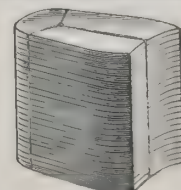
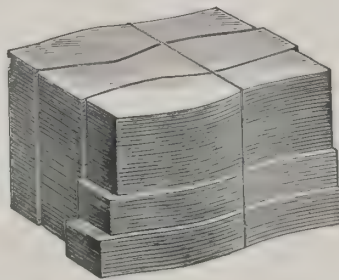
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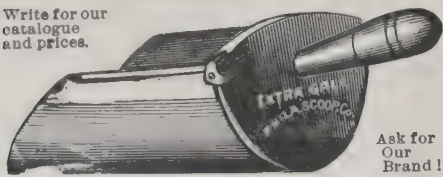
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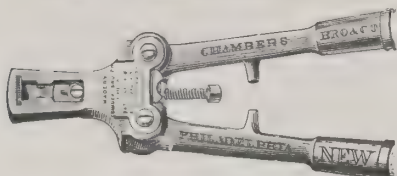
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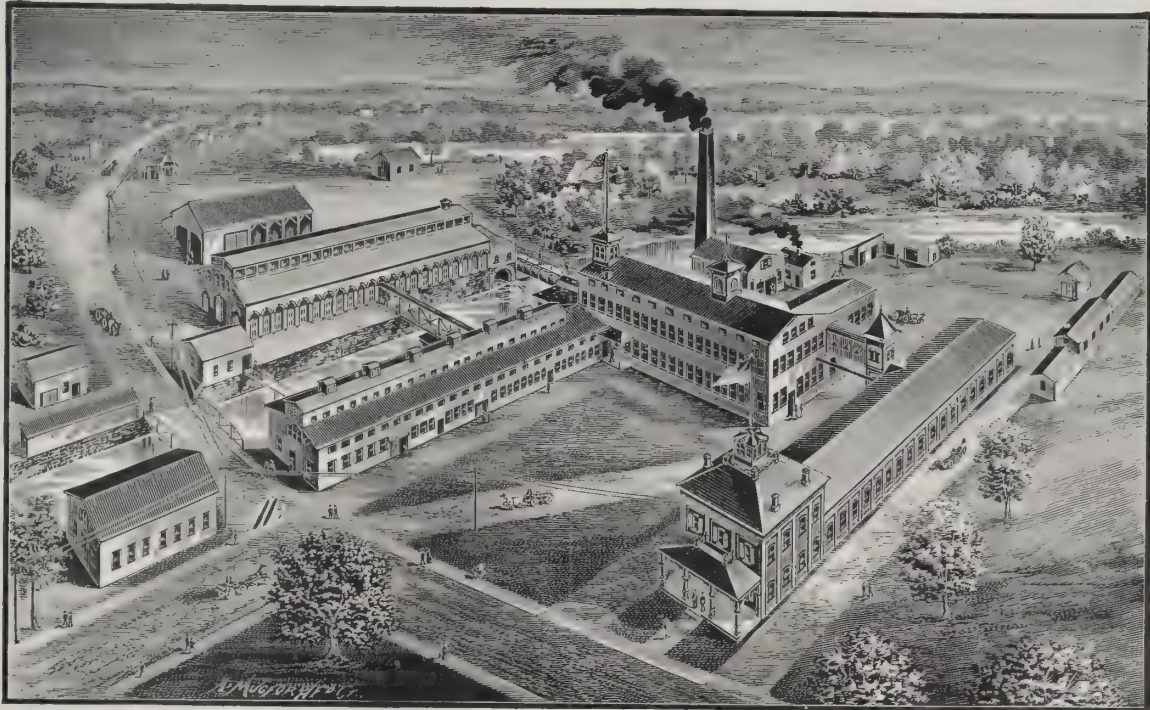


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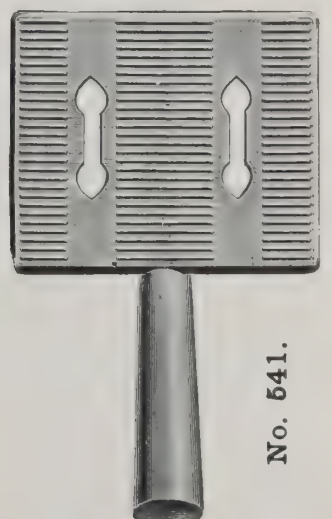
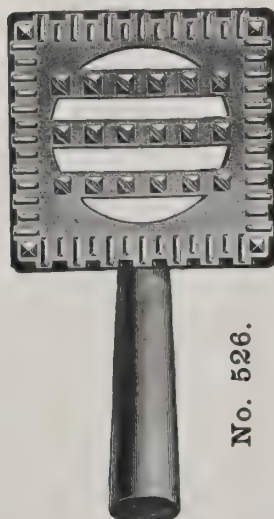
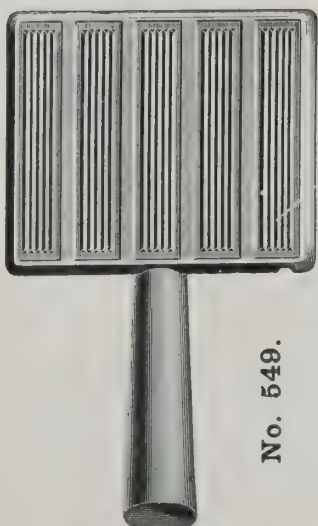
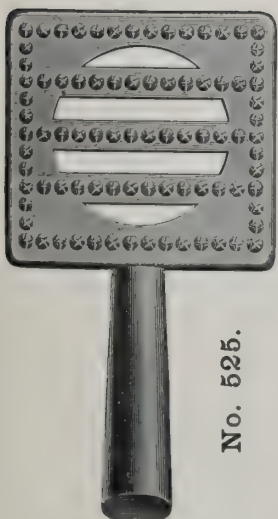
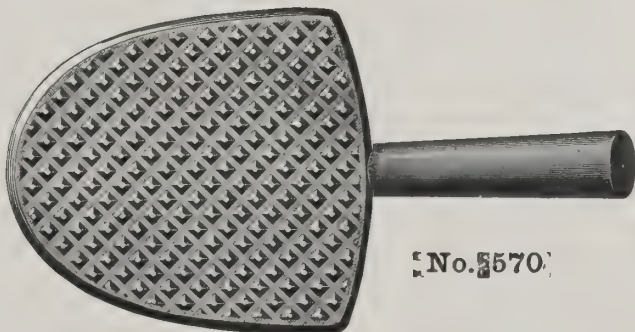
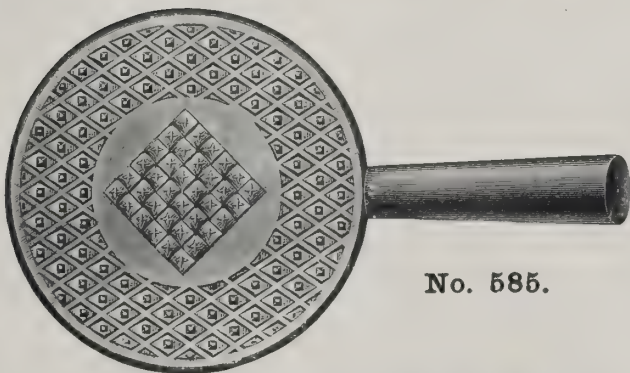
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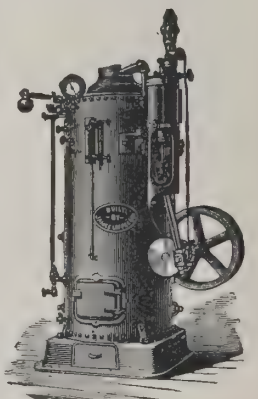
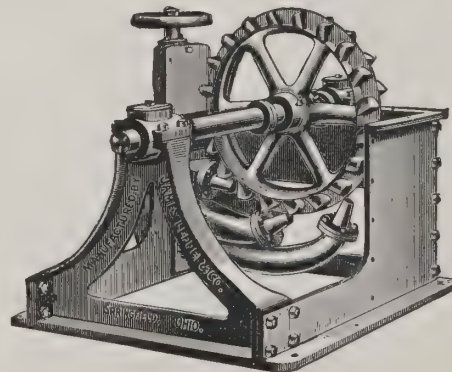
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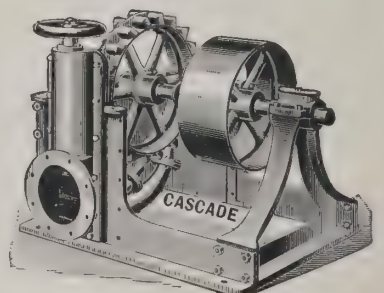
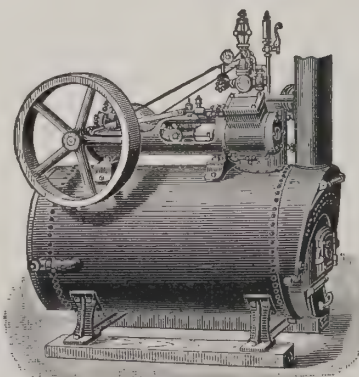
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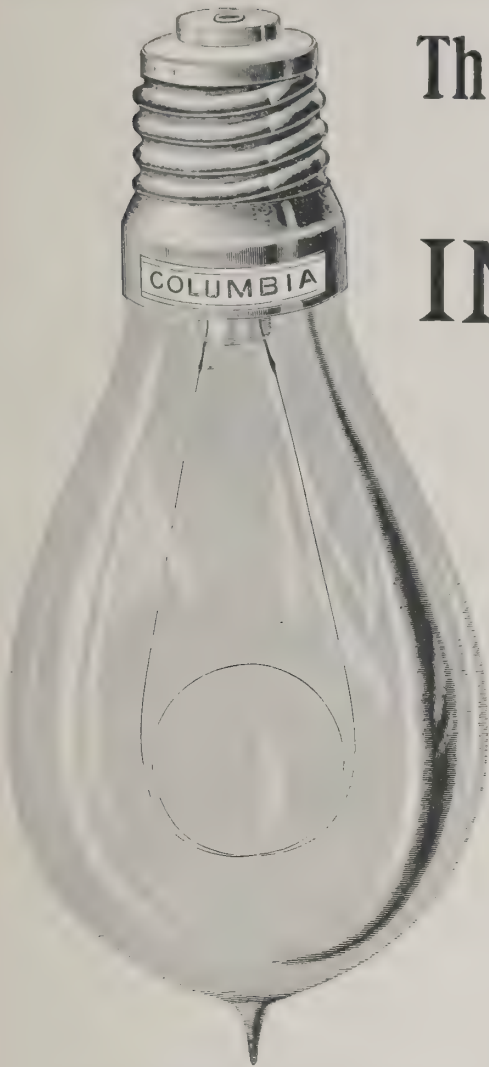


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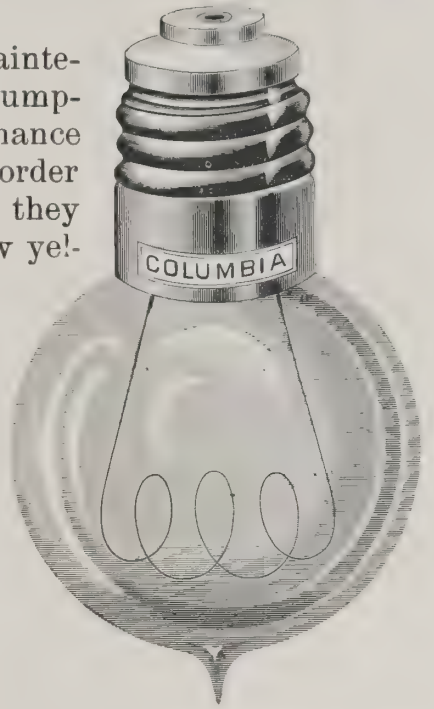
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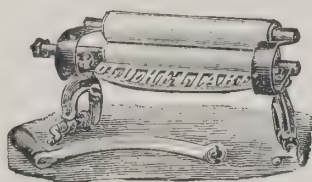
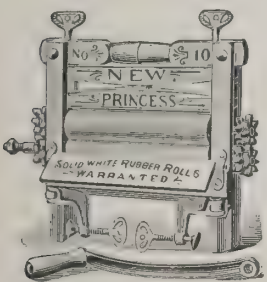
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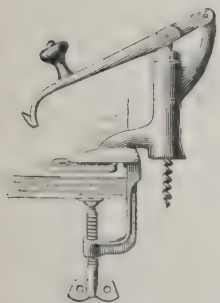
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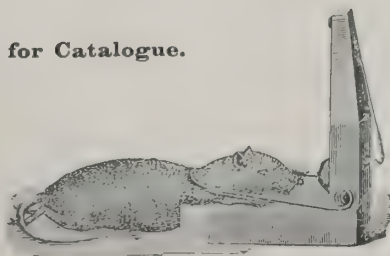
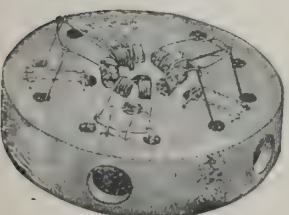
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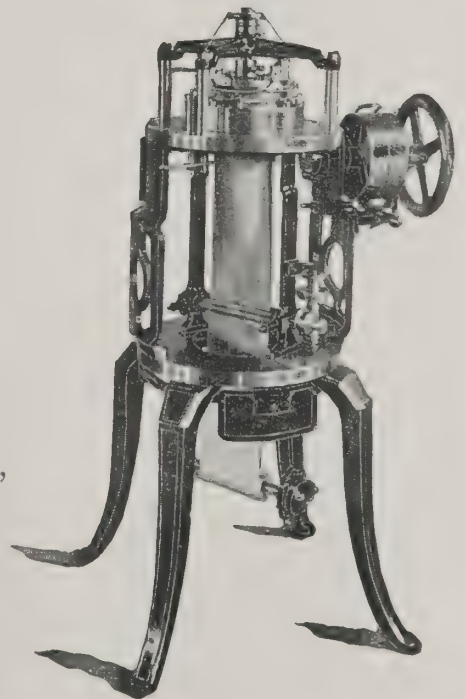
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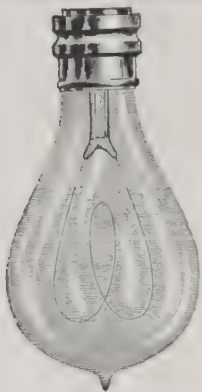
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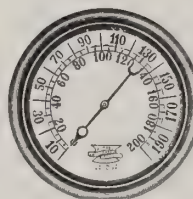
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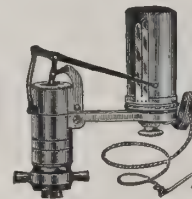
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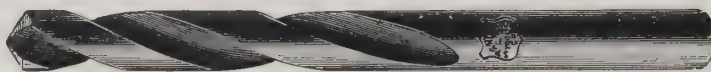
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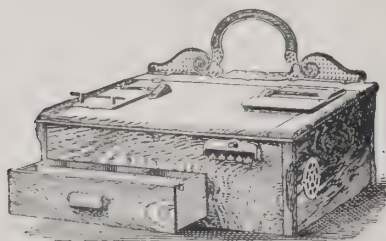
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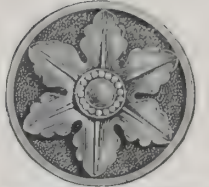
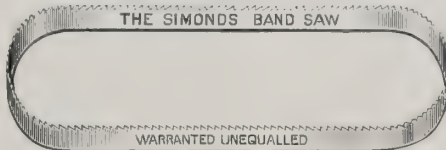


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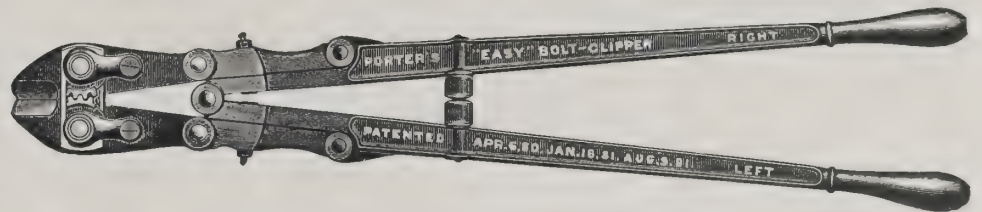
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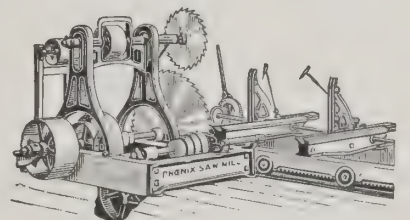
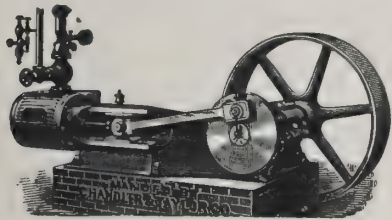
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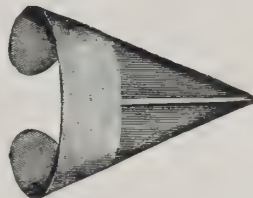
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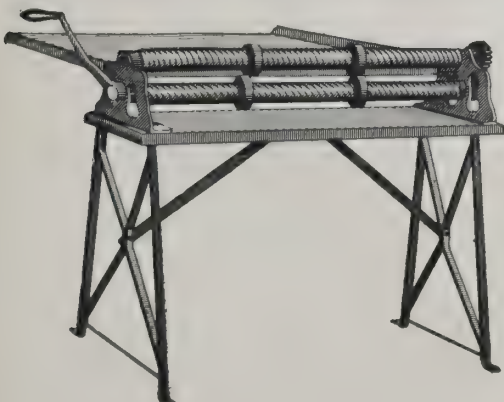
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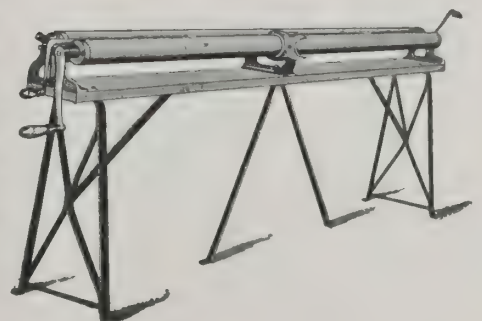
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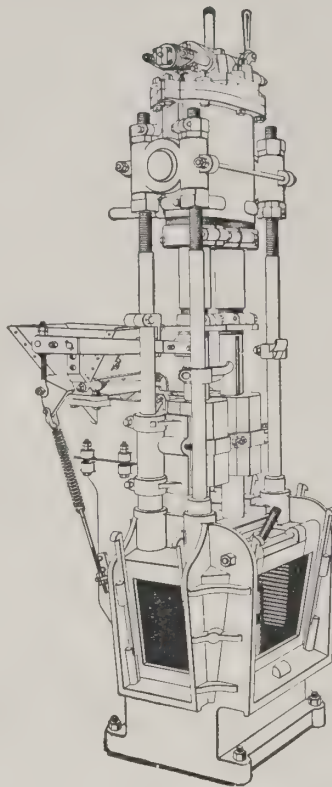
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It is impartial because it treats all its patrons alike. It cannot, for this reason, and it does not, publish write-ups or puffs of any specific make of goods, no matter whether advertised in it or not. It charges the same price for the same services to all alike.

We desire it distinctly understood by those who contemplate advertising in THE AMERICAN EXPORTER that space for advertising purposes is sold only upon the merits of the publication for that purpose. For this reason no advertising solicitor or agency has any right or authority to agree to give reading notices or to perform any special service whatever to obtain orders for advertising.

We make it a practice not to discuss the merits or demerits of other export trade papers. Comments on their value may be made with more propriety by those advertisers who have had experience in the use of such publications.

THE JOHN C. COCHRAN CO.



### LAI D OFF UNTIL STEAM SHOULD DIE.

IT is difficult for many having an invested interest in a present method of production or distribution, and who, perhaps, were looked upon as pioneers of progress when they made such investments, to realize that progress did not stop with the advance they made, but has moved on, leaving their advanced position in its rear. This is illustrated in all departments of human endeavor. Bidding adieu to the passing of the old, welcoming the coming of the new, is the ever-recurring drama of the death and life of humanity. The old struggles with all its energy to retain its hold upon existence, but the new, with the resistless power of growing life, never fails to supplant the old until in its turn it becomes "out of date" and is called upon to give place to another newcomer.

This natural order of progress gives occasion to the struggle for existence and supremacy that pervades all life, all human activities. It is illustrated in a broad way by the efforts of those interested in silver mining to perpetuate the use of silver as standard money beyond the period when it can serve such purpose to the best advantage of commerce, it having been demonstrated by experience to be less serviceable than gold. Commerce always uses instrumentalities of highest efficiency. When the economic advantages of gold over silver as the standard of value and money of final payment in settlement of exchange balances came to be generally recognized gold supplanted silver and became the single standard of value in the world's commerce. Those who do not recognize this change to be the result of natural causes are still fighting against the change, attributing it to vicious legislation, secured by the "money power" for the purpose of appreciating the value of gold and depreciating the value of silver, with the ulterior object of securing an unjust advantage over debtors. There is a mystery about the science of money, caused by the veil of self-interest, real or imaginary, which prevents large numbers of otherwise honest and intelligent people from seeing or understanding the true meaning of the passing of silver as standard money from the use of all progressive nations. An illustration of the operation of the natural law of progress may be given in another sphere of activity in which a majority of those still fondly clinging to the hope that silver may be reinstated to its old position of standard money on equal terms with gold have no direct or imagined interest, and for that reason one that they will immediately understand, and admit the decisive power of the new to permanently displace the old.

The oldest square-rigged American clipper ship now afloat is the "Eliza Adams," built in 1835. Four ships of this style have recently been dismantled that their hulks might be fashioned into coal barges. An interesting legend is connected with these four ships. The "Caravan," 1,395 tons, the oldest, was built in Bath, Me., in 1855; the "Fawn," 1,015 tons, in Bath, Me., in 1860; the "City of Montreal," 1,117 tons, in Portsmouth, N. H., in 1861; the "E. W. Stetson," 1,106 tons, in Damariscotta, Me., in 1862. These ships were formerly packets in the once famous "Swallow Tail Line." All of them have an honorable history. More interesting than any part of their active career, however, is the manner in which it was brought to a close. These four ships, with four others equally famous in their day, the "Hamilton Fish," "Therese," "Stamler" and "Mariana Nottebohn," all belonged to Thomas Dunham, a noted shipowner of the old days. His office was at 67 South street, New York. A barely legible sign over the now barred doorway still marks the place. Mr. Dunham, so runs the legend, fell out with towboat people many years ago. Strained relations were brought about by one of the towboat craft stranding one of his clippers while trying to bring it into port. This cost the owner some \$5,000 to get his vessel afloat and to make suitable repairs. He then gave orders forbidding any of his masters to have anything to do with anything propelled by the "upstart, steam." His ships had thereafter to work their way into port as best they could. The delays caused by the wind and tide worked so disadvantageously that trade slipped away from the line. Then, finally, in disgust, the owner recalled all of his ships, discharged their

crews, dismantled the vessels of all but their standing rigging and laid up the entire fleet in the Erie Basin, in New York harbor, vowing that "they should lay there until steam had had its day and sail power should come into its own again." There they have been for fourteen years alongside a grass-grown pier, passing into the sere and yellow leaf of ship existence.

In the course of time Mr. Dunham died. His estate passed to his nephews, who sold four of the eight vessels in March, 1897, to a purchaser who will prepare them for service as barges, in which useful form they will be towed about by the "upstart, steam," just as the purchasing power of silver is maintained by making it subsidiary to gold.

In a like manner horse cars have disappeared, driven out by the electric trolley car, and in thousands of places the supremacy of steam power is challenged by its new rival, electric power, deriving its energy from the older and once almost discarded water power. The old lives in the new. Progress is life.

### MANUFACTURERS AND FOREIGN MERCHANTS.

HOW to manufacture an article the best in the market designed for its purpose and at lowest cost is one problem. How to market the article when made at a satisfactory profit, is another problem. Business success depends upon the correct solution of both problems. The sales problem, as it is related to foreign trade, is the one that we are now considering. No hard or fast lines can be laid down for its solution that will be equally applicable and successful for all manufacturers. Methods for creating and holding a demand must vary according to the article to be sold and must be applied as intelligently to the art of marketing commodities as manufacturing processes are adapted to the art of their production. The progress of industry is expedited by an intelligent division of labor. The man who undertakes to do everything does nothing exceptionally well, and, in fact, does very little of anything. It is only through organizations that each man finds opportunity to do that which he can best perform. In examining these divisions of labor it will be found that experience has shown the necessity for every one that exists.

There are a multitude of instrumentalities ready to serve the manufacturer in the sales department as there are in the manufacturing department. His success is as dependent on the good judgment with which he selects the men and material he will use in the one case as in the other.

Omitting consideration of the question of transportation and publicity, the merchant is the most important factor in the sales department. The first question a manufacturer has to decide is whether or not he will be his own merchant. In an economic sense goods are never sold until they are finally disposed of for consumption. A manufacturer should not, therefore, lose interest in his products until they are actually consumed. In selecting his sales agents he should always bear this fact in mind. It is to his interest that such selling agents avail themselves of every opportunity not only to make sales of his products to the consumer, but see to it that should the consumer need another article of the same kind, or for the same purpose, that he buys the same make; that the demand is not only created, but held. Some articles may be introduced into a general stock of merchandise because the consumer requires no special instruction to enable him to use them. Such articles can be best sold by an agent who understand the wants and ways of consumers in the community in which he is located. There are other articles, mostly machinery, that cannot be successfully handled as items of a general merchandise, because the final buyer must be taught to install and operate them successfully. These requirements have brought into existence houses that devote themselves to the handling of such special lines of goods, hence the manufacturer, in order to successfully market his goods in foreign countries, should select as his agents houses handling goods in a general or special way, according to the character of his wares. When the goods are of a character that permit of their being handled in a general way, then the general merchant will serve him to



the best advantage. On the other hand, when the article is of a special character, requiring skill to install and operate, then the merchant handling similar goods only should be employed, so as to secure special attention to his own products.

We have stated the requirements for marketing goods from the manufacturers' viewpoint as a means of clearly showing foreign merchants, importers and special salesman the way in which they can best build up a business for themselves. By selecting those commodities which they are best fitted to handle and devoting themselves to creating and holding a demand for the same the seller can make himself as serviceable to the manufacturer as the latter can be to the seller. A mutual interest can be developed, the American manufacturer representing the factor of supply and the foreign merchant representing the factor of demand. The one will complete the business of the other, and the resulting prosperity will be equitably divided. The desire of an American manufacturer to secure a foreign demand for his products creates an opportunity for a foreign merchant of which advantage should be promptly taken. This desire is expressed by those who advertise for export business.

#### MACHINERY EXHIBIT — ANGLO-CHINESE COLLEGE, FOOCHOW.

THE spirit of enterprise is abroad in China. The opening of American expositions in Peking and Shanghai has induced a call for something of like nature at Foochow.

The Anglo-Chinese College of Foochow was founded by a Chinese gentleman and is supported partly by the fees of students and partly by the Methodist Episcopal Church. It is the largest school of the kind in China, having over 200 self-supporting students, many of them sons of the leading men of the city. In this college the English language is taught and the sciences through this medium. The college has gradually become a centre of general intelligence in everything connected with the opening of that part of China to foreign trade.

Every great country in Europe regards the control of the trade of China as the grand prize now open to commercial enterprise and is making mighty exertions to secure it. Every effort in this direction made by Americans is greeted with substantial encouragement. Immediately after the close of the war with Japan, as soon as it was known that foreign machinery might be imported, there were many inquiries for foreign goods.

Mr. Geo. B. Smyth, principal of the Anglo-Chinese College at Foochow, believing that an improved method of crushing sugar cane would be a boon to the people of that section, ordered an American machine. When it arrived he advertised it and showed its advantages over native-made mills. Many came to examine it. Its superiority over the mills in common use was so apparent a cash purchaser was found for it without waiting the demonstration of a trial. The cane has to be put through the Chinese stone mills three times, and then not over 75 per cent. of the juice is extracted. Mr. Smyth writes that he is confident many more American mills can be sold in his vicinity. He also reports that a missionary at a place about 75 miles from Foochow imported a sugar evaporator a short time ago, which convinced those who saw it at work that it was just what they needed. In writing to Mr. Smyth about it this gentleman declared his belief that the general introduction of such evaporators throughout the prefecture in which he lived would effect a saving for the sugar growers of at least 1,000,000 Mexican dollars per year, by reason of the economy of fuel and superiority of output. Mr. Smyth further states that a small American flour mill is being erected in a country town about 50 miles from Foochow, from which much is with good reason expected. This shows the present tendency to use American machinery in that part of China. It is a tendency which will increase speedily in force and volume.

After giving these illustrations Mr. Smyth says: "I am confident that there is a great future in this province for small machines of various kinds, such as cotton planters, sugar mills, sugar evaporators, flour mills, small seed-oil plants, pumps for irrigating and

small engines and boilers for such of the above as use them. From the best information I can gather there are large tracts of country south of Foochow which could be made fertile by proper irrigation. A wind mill is now being tried at one place for this purpose with every prospect of success. Of course the chief obstacle to a wind mill is the prejudice of the people against anything that will change the accustomed face of the country."

Emulating the example of Peking and Shanghai, Mr. Smyth desires American manufacturers to send exhibits to the Anglo-Chinese College, Foochow, over which he presides, and full descriptive catalogues of their entire line of products. He feels sure that profits on resulting orders would soon cover the cost of the exhibit, as he has had a great many inquiries for the machines mentioned above. This appears to be an excellent opportunity to create the nucleus of another American trade centre in China, of which American manufacturers will undoubtedly avail themselves. Full particulars of the proposed exhibit can be obtained by addressing Mr. George B. Smyth, principal, Anglo-Chinese College, Foochow, China.

#### CASH VS. CREDIT BUYING.

THE merchant who offers to buy for spot cash settles many questions and secures every obtainable advantage in price. It is an old business maxim that "Goods well bought are half sold." It is certain that every advantage gained by buying for cash tends to make a profitable sale possible. The merchant who buys for spot cash can, if pushed to it, sell at prices that represent cost to a credit buyer and realize a moderate profit.

It is frequently alleged that foreign manufacturers secure and hold their trade through the credit they give to buyers. The function of credit in the world's commerce is of high importance, but it is of still higher importance to those who use credit to understand its limitations of helpfulness. A manufacturer may push his goods into the warehouses of merchants more rapidly and in larger volume by giving credit, deferring the day of payment for three, six, or, possibly, twelve months, but he will not do so if there is a reasonable doubt regarding the probability of final payment. In such transactions the credit buyer makes his gain by having goods to sell in which the manufacturer's or commission merchant's capital is invested, instead of his own, but having once established his line of credit he is bound by it to continue giving his orders to those who hold his obligations. He thus not only loses the advantage of discounts for cash, but also the benefit of freedom of choice in making purchases. These disadvantages are perpetuated as long as the seller is permitted to hold a claim against the buyer, but the latter soon becomes a cash customer, since the limit on his credit compels him to pay old bills before contracting new ones. By this means he is prevented from using his cash to best advantage for new purchases. He becomes a cash buyer without securing any of the advantages accruing to those who buy for spot cash.

A merchant's credit should be better at home than in a foreign country. He should therefore be able to secure credit at his local bank on better terms than from a foreign manufacturer or commission export house. By discounting his paper at home and buying for spot cash he gains every advantage of a spot-cash buyer while using his credit as a means of obtaining capital with which to carry on his business. Using credit in this way induces a degree of conservatism not compatible with buying directly on credit, because borrowed cash fixes a limit to purchases far more rigid than borrowed goods. This view of the subject shows clearly that it is better for the manufacturer or the commission export house and far better for the merchant that he should use his credit at home and buy for cash from the start.

None will deny that the best merchants are those who buy for cash. Whoever can hold their trade can unquestionably hold the trade of credit buyers if they choose to accept it. Those who give no credit, confining their trade exclusively to cash buyers, command the best business of the markets. The advantages they offer are all of the kind that count for the best advantages for the mer-



chant when he turns to the other side of his business and becomes a seller in competition with credit buyers. As before pointed out, the cash buyer can sell and make a moderate profit at prices that would represent no profit to a credit buyer. This advantage results in the retail, exactly as in the wholesale trade. Free-handed cash buyers seek those who can give them best value for their money, while the never-do-wells buy where they can procure credit. Here the two ends of the circle meet. Cash buying makes cash selling possible, and cash selling sustains cash buying. The credit offered by foreign manufacturers or commission export houses is intended to catch buyers, as fly paper catches flies. As soon as they touch it they are stuck fast until they die or by herculean efforts free themselves from the thing that caught them. Cash selling and cash buying make sound and profitable business for manufacturers and merchants. When additional capital is required to carry stocks for a season good financiering demands that it be obtained in the home market from those who deal in credits.

### HAS PERPETUAL MOTION BEEN DISCOVERED?

IF perpetual motion has not been discovered an assurance that a near approach to it has been made which gives promise of revolutionizing mechanics is sufficiently startling to arrest attention and call for most careful investigation. The many things once thought impossible, but since accomplished, have prepared the mind to accept the claims of inventors and scientific students more readily than it once did. This fact may cause some to be misled, through acting without sufficient investigation or before subjecting the device or process they are solicited to become interested in to a service equivalent to practical use. With these words of caution we report statements made by C. E. Tripler, of New York, concerning his apparatus and methods for developing power from air. He designs to revolutionize transportation and manufacturing. Liquefied air is the agent of energy which he claims is to take the place of steam and produce power at a minimum of cost.

How he liquefies air is a secret Mr. Tripler is not ready to tell. This has been accomplished in small quantities as a laboratory experiment, but never for commercial purposes. When liquefied, the air is at a temperature of 450 degrees below zero, on the Fahrenheit scale. It boils or vaporizes again at 310 degrees below zero. It is from the expansion consequent upon vaporization after being liquefied that Mr. Tripler obtains the power, which is transmitted through an engine exactly as the power generated by steam from boiling water is transmitted.

Mr. Tripler declares it is possible to obtain a pressure of 2,000 pounds to the square inch at a temperature 200 degrees below zero, and at practically no cost, from liquefied air, while to obtain 150 pounds of steam a temperature of 360 degrees above zero is required and the consumption of large quantities of coal. It can be seen that if this contention is true all ideas of transportation and manufacturing must be readjusted.

The most remarkable claim follows. Mr. Tripler declares that liquefied air in boiling or changing to vapor again absorbs the heat in the surrounding air so rapidly that it in turn is liquefied and flows into the reservoir, which in this manner is always kept supplied. That is, once the apparatus is charged with a supply of liquefied air it feeds itself, and will practically run forever without any cost for fuel. He also declares there is no loss of power in this process.

Professor Gordon, of Columbia College, New York, an authority on physics, is reported by the New York *Herald* to have said, when asked for his opinion on the matter:

"Of course, it is possible to liquefy air. That has been done repeatedly, and there is no reason why an engine should not be run with it, but it has never been done commercially, and energy must be used to liquefy in the first place. It seems absurd to say that the apparatus will feed itself without loss of power. It has been demonstrated that liquefied air in vaporizing will condense a very small proportion of its own bulk from the surrounding air, but the pro-

portion is so small that it may be disregarded. Of course, if Mr. Tripler's claims are true he has made a wonderful discovery."

A dispatch from Washington to the *Herald* says that Consul-General De Kay in Berlin reports to the State Department that Professor Linds, of Munich, has discovered a cheap process for liquefying air, which seems to be almost identical with that claimed by Mr. Tripler.

In appearance Mr. Tripler's apparatus resembles an ordinary barrel placed above a small engine. The interior of the barrel is lined with a thick coating of felt or some other non-conducting material, and is filled with a network of pipes, somewhat like a condenser in a distillery. In the bottom of the cylinder is the tank containing liquefied air. The method of operation is Mr. Tripler's secret. Further developments may be looked for with interest.

### UNITED STATES OF AUSTRALIA.

A NEW nation is to be born. The Australian Federal Convention, which had been in session for some time, concluded its labors March 31, 1897. The convention was presided over by Mr. M. C. C. Kingston, Q. C., M. P., the Premier of South Australia.

The powers, privileges and territory of the various colonies are to remain intact, excepting those powers and privileges delegated to the Federal Parliament. The exclusive power to impose and collect customs and excise duties, and the control of military and naval forces is vested in the Federal Parliament. Trade intercourse between the colonies is to be absolutely free. The Parliament is to consist of a Senate and a House of Representatives. The Governor-General is to be appointed by the Queen. A Supreme Federal Court, which will also be the High Court of Appeals of the colonies, is to be established. All of these measures were unanimously adopted. Constitutional, Finance and Judiciary committees were appointed.

The colonies of Victoria, New South Wales, Tasmania, South Australia and Western Australia were represented by delegates.

### WORLD COMMERCE.

THE perfection and multiplication of facilities for the dissemination of information, exchanges of commodities and personal intercourse that has taken place within the nineteenth century have rendered world commerce possible. To-day no nation subsists exclusively upon its own food products. To-morrow no nation will hold its domestic market to be of greater importance than the world's markets for the products of its fields and factories. A nation can no longer exist in isolation. Exports and imports are as necessary to its welfare and prosperity as the ability to exchange his services for what others have produced is to an individual.

The expansion of domestic markets to include the world is the desideratum of every enterprising manufacturer and merchant. All problems of production and business organization must be solved before prominence can be acquired in a domestic market; beyond this the problem of acquiring prominence in the world's markets is narrowed to the intelligent use of facilities for making products and advantages for conducting business widely known. No difficulty is presented to a manufacturer to produce an article for use in every country in the world that is not presented when he undertakes to produce an article for the use of his next-door neighbor. All the difficulties in making a shoe are involved in its production, not in the foot that is to wear it. No essential requirements, differing from those he must master to sell the products of the fields and factories of his immediate vicinity, are necessary to enable a merchant to sell the products of the fields and factories of every section of the world. He must understand what his customers can use to their advantage and what they can afford to buy. He must also understand the goods he wishes to sell, and know the sources of supply from which he can obtain them. Only the unknown is foreign to the mind. When a manufacturer causes the merchants of the world to know what he produces, the advantages derived from its use, and for what purpose it is designed; when a merchant causes



the manufacturers of the world to know what commodities he can sell, what services machinery and devices are required to perform in his locality, the quality and kinds of goods his customers need, that manufacturer, that merchant, ceases to be a foreigner in any country. By making himself and his business known to the world he becomes a citizen of the world, and his transactions become items of world commerce.

During the Winter of his locality a world-known manufacturer may be engaged in making Summer goods, to be sold in other countries where Summer is in full sway, following perpetual Summer in its course round the world. Providing for the ceaseless march of the seasons a world-known merchant can secure supplies from every zone and country adapted to the changing needs of his locality, bringing to his customers every provision for their comfort, the creation of which has anywhere been induced by the universal touch of the seasons. World commerce is simply domestic trade enlarged

### A TRUE WONDER STORY.

THE wonder stories of science are more wonderful than the stories of fiction. The latest comes from Chicago, Ill., U. S. A., and describes a process of "laundrying the inside of a man's stomach." It is reported, with the aid of a little machine which looks like an egg beater, Dr. Fenton B. Turck recently performed this feat at the Post-Graduate Medical School, and by means of the Roentgen rays he at the same time viewed the internal apartment where his little device was at work. The operation was the first of its kind made in full view of the operator, and marks an era of progress in medical science.

A press dispatch to the New York *Herald* describes the devices used and the operation as follows: "Dr. Turck calls his instrument a 'gyromele.' Attached to one end is a flexible cable, or spiral steel wire, on the end of which is a small sponge. The cable is inclosed in a rubber tube, and this, with the sponge, was swallowed by the patient. The patient then stepped before the Roentgen rays, the doctor put the fluoroscope to his eyes and an attendant turned the handle of the gyromele. The sponge proceeded to its work of scouring the inner walls of the stomach, while the doctor viewed the work. No nausea or great discomfort was felt by the patient, though he stood before the rays more than an hour, while the doctor and nurses in attendance watched the operation. The Roentgen-ray outfit used is capable of throwing a 14-inch spark of great density and illuminating a large Crookes tube. By its means it was not only possible to see the ribs and backbone of the patient, but to view the vibrations of the heart and to outline the liver and kidneys.

In the light of such accomplishments one may be excused for ceasing to believe any proposal impossible and for composing himself to receive the next greater story, which is sure to come.

### FROM NEW YORK TO QUEENSTOWN IN TWO DAYS.

CAPTAIN CARL J. H. FLINDT, of New York, has invented a propeller, which, when driven by a gasoline engine, is capable of developing a speed, in smooth water, of more than fifty miles an hour. He is a practical seafaring man with seventeen years of experience, and hopes, by his new devices and construction, to revolutionize travel by water. He has spent five years in experimenting on his pet project. In that time he has made more than fifty propellers and has improved on each, until now he believes he has devised a design that warrants him in putting it into practical use.

This propeller consists of two steel plates, each with two flanges, which cut the water in a way to produce the least resistance. The blades of the propeller to be used in the trial trip across the Atlantic are 3 feet across and 2 feet from the top of the blade to the shaft. They are thicker at the base than at the top.

The vessel to be propelled, now about one-third completed, is to be named the Dolphin. It is constructed on the "whaleback" principle, and is intended to go through the seas rather than over

them, thus offering the least resistance to the waves, which in heavy weather will pass over the vessel instead of beating against it, and thus retarding its speed.

The vessel is made of steel, oak and cedar. It is 67 feet long, 6 1-2 feet beam, 5 1-2 feet draught, 12 feet high from keel to the top of deck, with a pilot-house 4 feet high in addition; 10 tons burden. It has a saloon 13 feet in length, three staterooms, a kitchen and an engine-room. Its ordinary crew will consist of five men, but there will be accommodations for thirty persons, while fifty can be carried if the decks are utilized.

The motive power is gasoline. A 20-horse-power engine is placed abaft amidships with other machinery. Many engines were examined and rejected before one was found that would meet the requirements.

Nineteen models were made before deciding on the present one. With this vessel Captain Flindt fully expects to make a trip from New York to Queenstown in two days, if the sea is smooth, or within sixty hours at most. Having done this he expects to apply his invention to vessels of large tonnage devoted to passenger traffic, and to such crafts as torpedo boats, mail boats and pleasure crafts. He expects his propeller to raise the speed of a 15-knot vessel to 20 knots.

The public will not have long to wait for the trial trip, the success of which will give confidence in all the captain claims.

### WHERE TO BUY GENUINE AMERICAN-MADE GOODS.

THE good reputation of American-made goods has spread over the world faster than arrangements for foreign representation has been made by American manufacturers. Taking advantage of this fact foreign manufacturers are flooding markets in other countries with their imitations of American products.

A foreign buyer who wants American-made goods, if not in quantity or of a kind to make it a good business policy to establish direct trade relations with American manufacturers, can always secure genuine American-made goods by ordering from an American export commission house. THE AMERICAN EXPORTER will furnish the addresses of reliable houses to intending buyers on application and without charge.

In this connection it is well to call attention to the fact that the protection afforded to American inventors by foreign patents is of short duration, and the protection afforded by trademarks is sometimes visionary. As soon as foreign patents on American machines expire foreign manufacturers commence to make such machines, claiming that their product is as good as the American-made. Sometimes they will go as far as to copy the name of the American maker, trademark and all. When such machines are offered to foreign buyers they should keep two points clearly in mind:

1. The foreign imitator of an American-made machine cannot make a better machine than the American. If he could he would not imitate the American machine. More than this, if he could make as good a machine he would do so and sell it on its merits instead of trying to secure trade by imitating some one else.

2. Machines manufactured by their originators are always improved "up to date." Imitators at best can only produce a machine as good as some old pattern that has been on the market long enough to permit of its falling into the hands of an imitator. To this must be added the time required for the imitator to make his machines and get them on the market. By the expiration of this time a buyer may be quite sure the original makers have superior machines of a better pattern which can be obtained at once by ordering from proper houses.

For these reasons buyers of foreign imitations of American-made goods never obtain articles as good as those supplied by the original American manufacturers. The genuine is always the best. To get the genuine order from American export commission houses, or foreign importers who have American connections. As America is the best place for foreign importers to buy American goods England is the best place to buy English goods and Germany for German goods.



### BAGGAGE-CHECKING SYSTEM IN EUROPE.

THE announcement is made that the American system of checking baggage has been adopted by several European railroad companies for the benefit of American tourists. Hereafter all baggage passing through New York City from any point in the United States may be checked through to almost any point in Europe. American travellers who have formerly suffered annoyance by being compelled to pick their trunks out of great piles of baggage and then fee porters to rescue them may now forget that they have trunks until they find them delivered at their hotels.

This revolution has been brought about by a young man of New York City, who, having considerable experience with a forwarding firm, conceived the idea of checking baggage through European countries. He has been rewarded by being recognized by the management of the principal European railways. The London and Northwestern was the first railroad to act on his suggestion. Others soon followed.

In our opinion this beginning of the American baggage-checking system in Europe will lead to its complete adoption. Europeans will soon ask why facilities extended to Americans cannot be extended to them, and Americans will ask why advantages given to baggage passing through New York City cannot be extended to all American cities. The answer to these questions will be a general adoption of the system.

### HOW TO AUTOMATICALLY SAND CAR TRACKS.

A MECHANICAL genius, a boy only 12 years of age, has solved this problem. Mr. J. H. Robertson is the superintendent of the Third Avenue Cable Road, New York City. His son, George H. Robertson, only 12 years old, when not in school spends much time in the car shops. He heard his father say, a few weeks ago, that any one who would invent a device to make the sand flow freely and automatically for sanding car tracks would make a fortune. This set the boy to thinking.

In a short time he came to his father with a rough drawing of a drill which at once struck Mr. Robertson as eminently practical, and which he will immediately apply to all his sand cars. The device consists of a toothed wheel placed in the bottom of the hopper, and connected by a chain gearing with the axle of the car. When the car is in motion the wheel revolves rapidly and "chews up" the sand, which causes it to flow freely through the aperture in the bottom of the hopper. It is a money saver also, as it enables four men to operate the car. Eight men were required by the old method, and the service was less satisfactory.

### SHOWING MACHINERY AT WORK.

A NEW American machine in a foreign country without an operator who fully understands it and is in sympathy with it is about as helpless as a person in a strange country when he does not understand the language in use and no one understands his. It is but natural when American machines are first sent to a foreign country that they should not be fully understood and that workmen who do not understand them or are not in sympathy with them fail to realize all the advantages obtained from them in this country. It would be better for all American machinery, and therefore for its manufacturers, if in its first introduction into a foreign country it could be installed for practical work and operated for a time at least under the supervision of practical American workmen. Its record once made in this way in their own country would silence the cavil of foreign manufacturers and workmen and compel them, if they failed to realize as good results from the same style of machine, to seek the cause of their failure in themselves and not in the machine.

We are glad to note that this practical method of showing machinery at work has been adopted by manufacturers of American laundry machinery. They have installed a complete laundry plant at Fulham, England, and appointed the persons in charge of its operation agents for the sale of such machinery. An intending

buyer, therefore, has the advantage of seeing the machinery doing the work for which it was designed and constructed, and the kind of work for which he will use it if he buys. Such conditions are of great advantage to the agent, and of still greater advantage to the buyer, because he is not only made sure that he is getting what he wants, but, by spending a little time in superintending the machinery in operation, he can learn how to use it to best advantage. May such exhibits increase.

### International Co-operation in the Advancement of Science.

THERE is a growing appreciation of the fact that the secrets of science, as they are from time to time revealed, are not, or should not be, considered as the property of the individual, but that they belong to the race at large. This is evident from the increase in the number of societies for the promotion of science, some of which take a name which indicates that this advancement is the special object of their endeavor. Closely allied to these are the specific technical and engineering societies, at whose periodical meetings the experience and discoveries of the members are recorded, and subsequently published for the benefit of the general public. In addition to the monthly or quarterly meetings of the local branches, there are the great annual gatherings of the technical and scientific societies, in which the chosen representatives of the local societies meet to discuss the progress of the year, and present such new theories and laws as have been proposed or discovered.

It would be difficult to overestimate the service that has been done to science, whether pure or applied, by these annual conventions. In reading the reports of proceedings, especially the proceedings of the annual conventions, we have often been impressed with the fact that the authors of two different papers upon the same or related subjects will frequently supply each other with the missing link in their arguments. Separated, perhaps, by many thousand miles of distance, they have attacked the problem from two different points of view, and the half truths which each investigator had discovered, and which promised separately to remain an unsolved problem, dovetail together at the convention into a complete demonstration. Co-operation is the very life of successful scientific research; for genius is scarce, while industrious mediocrity is plentiful. There are, doubtless, multitudes of searchers in the fields of science who are carrying fragments of disjointed truths which, if gathered in one place and pieced together, would make a valuable addition to the ascertained truths of science.

It is true there are the columns of the scientific press, which have undoubtedly proved the most effective of all means for the exchange of ideas, the record of discovery, and the spread of scientific knowledge; but the general congress or convention has the advantage that it is not local in its scope or effect; that the attention of the scientific world is centered upon it in the expectation of hearing the very latest and most important scientific facts; and that in the various meetings there is an opportunity for the verbal exchange of ideas for question and answer, and for detailed and exhaustive debate. There is an incidental but very real value, moreover, in the scientific congress in the fact that it brings the members of widely-separated districts into contact, and introduces that element of personal sympathy and regard which is one of the most promising features of our modern civilization.

It was a natural step from the National to the International Congress. Within the past few years several of the latter have been organized, and in nearly every case they have grown steadily and accomplished good work. The arguments for the National are doubly strong for the International Congress: for the wider differences of climax, character, opportunities and methods of research which exist among nations give the annual reunion of their leading scientists a special value. For, undoubtedly, the system or general drift of scientific research undertaken by any people will be modified by its national temperament. In Germany, we might expect that the theoretical tendency would be predominant; in England and America, the practical; and it is in the personal intercourse of the representatives of these separate schools that we naturally look for special results, which could never be independently achieved.


The time is certainly ripe for the establishment of a great industrial association for the advancement of science. The various national associations have shown by their recent fraternal exchange of courtesies that they are prepared for it and are fully alive to the benefits which it would confer. They are selecting their places of meeting near the national border lines, in order that the interchange of visits may be facilitated. We learn that the American Association will meet next year at Detroit, and that it will adjourn to Toronto to assist in welcoming the visiting British Association.

This body has responded by inviting the officers of our gathering to attend as honorary members, and throwing its doors open to all the members and fellows. The same spirit is shown across the water, where the Association Française pour l'Avancement des Sciences has chosen Boulogne as its meeting place, and in response to its suggestion that the British Association should meet at some town on the opposite coast, the latter body has chosen Dover for its gathering in 1899. The mention of the year 1899, the closing year of the century, naturally suggests that the opening year of the twentieth century would be a fitting time for the first meeting of an international association. It will be the year of the great Parisian Exposition, which will be certain to attract a large number of scientists from both hemispheres, and the intervening national meetings will give ample opportunity for founding the association and concluding all necessary arrangements.—*Scientific American*.



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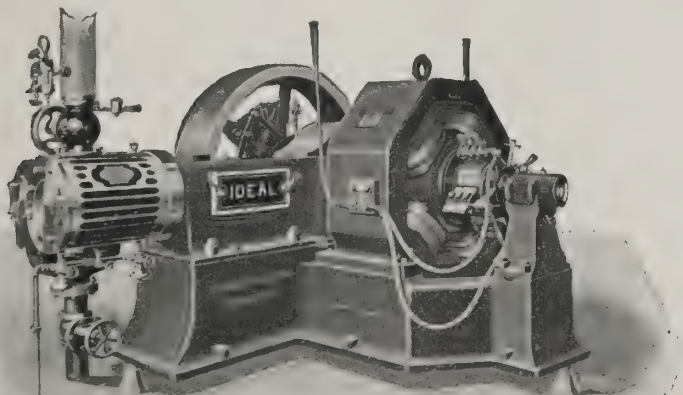
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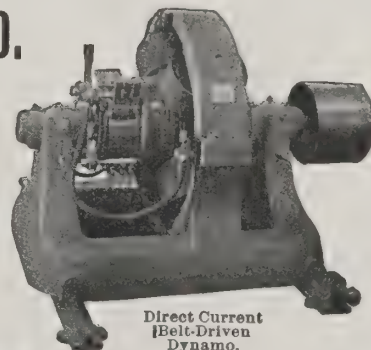
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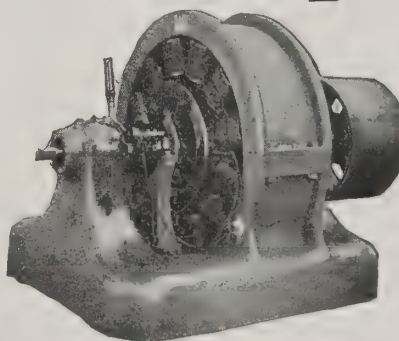
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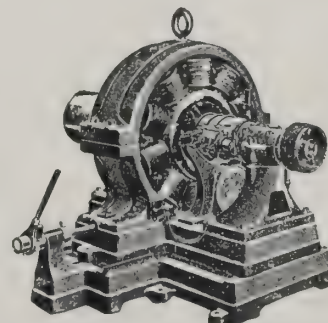
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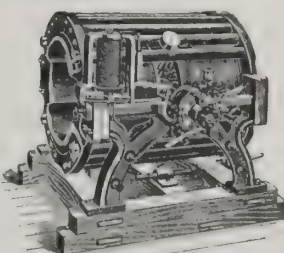
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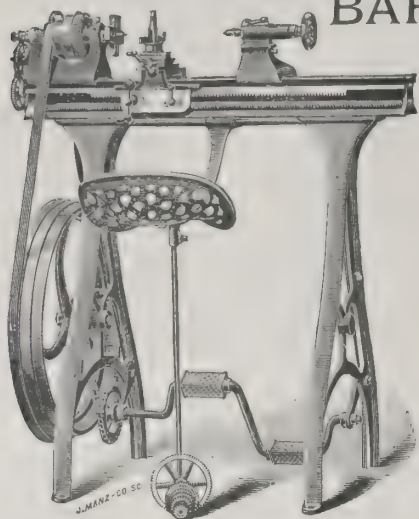
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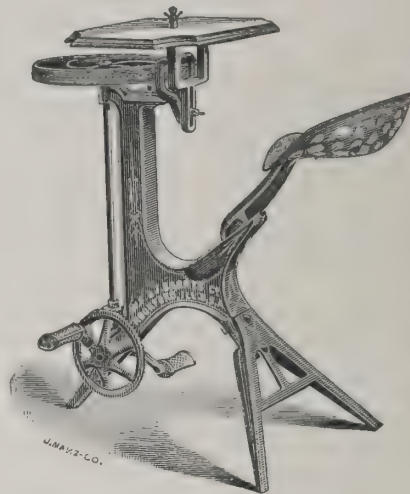
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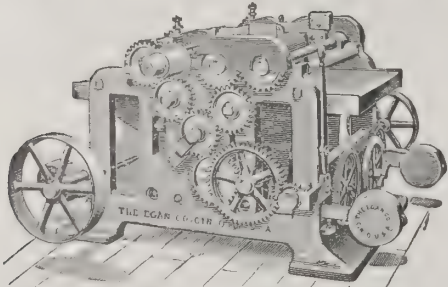
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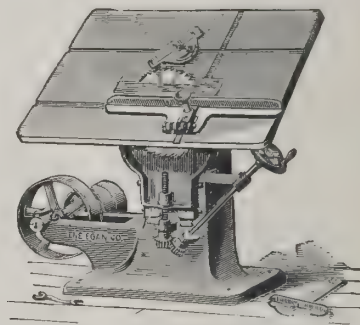
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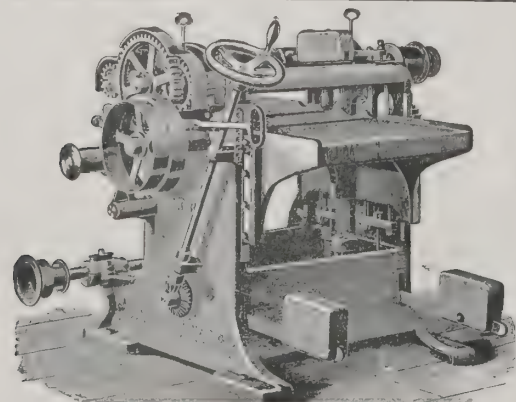
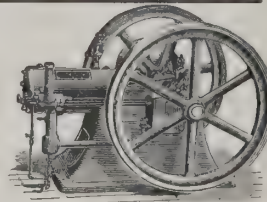
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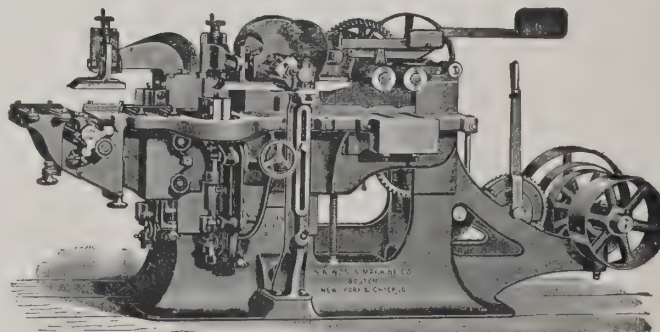
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### American Machines.

ONE of the more gratifying surprises in the American machinery trade has been the increase of its foreign demand. It has taken time to make its special merits known. That this time has not been wasted is evidenced by the general and world-wide discovery of the potential fact and its emphasized appreciation. The American machine is now to be found in every industrial and progressive country, and that in the face of severe competition, and of criticisms due to deep-rooted prejudice. It has won its way on its merits. The question of cheapness has been subordinate to that of efficiency. Cost is compensated by more speedy and accurate methods of production, and the matter is purely one of results and not of invoice. This is being repeatedly demonstrated. The best is the cheapest. For no other reason is the American machine capturing foreign markets. The consequence is an increase of exports, and the fact that during the late period of depression in which home demand fell below the par, not a few of our machinery industries were kept busy on foreign orders. Nor was the demand limited exclusively to our best customers in Great Britain and its various colonies. Other countries, though late in the field, have imported considerable American machinery, and are likely to keep doing so. The ball continues to roll. Industrial development is no longer limited to certain groups of nations. Commercial ambitions and national necessities are stirring up enterprise once dormant or unborn. In South America, Japan, China and Russia, in Asia, the new impulse of life is industrial. In the deployment and development of this stimulant we have the forecast of new and important markets for the American machine. It includes the demand for apparatus in the thousand and one forms of improvement and progress. In the development of native resources of wood, mineral, etc.; in methods of carriage or transport on land or sea; and in the nearer approach to personal comfort and convenience in domestic and industrial life, we have the varied but potential incitements to growing demand for mechanical aids.

In the textile industries of Egypt and India, Japan and China; in the mining and colonial enterprises in Africa and in the Australasian group, and in the furnishing of Europe with the best equipments of manufacture and production, the scope of the American machine is broadening, and it can only be from indifference to, or a practical non-appreciation of your opportunities, if the machine-builders of the United States fail in securing the prize already in sight.—*Age of Steel*.

### Diving Apparatus.

THE mines of wealth lying at the bottom of the sea incident to the sinking of ships in times of war, and the ravages of storms in times of peace, have stimulated inventors in the production of devices by which submerged ships which remain practically intact can be raised, and means by which divers can safely descend and remain beneath the surface for the purpose of locating such craft, and their condition and best method of applying means for their recovery.

The art of diving to considerable depths under water to bring up pearls, corals and sponges has been practiced in the Indian seas from very early times; and if we may believe the accounts that have come down to us, the feats of the early divers are truly remarkable—some of them, it is said, having been able to prolong their submarine stay from two to three minutes. It is obvious, however, not having the aid of any artificial appliances for supplying air, the powers of these bold adventurers, both as regards the depth to which they could descend and the length of time they could remain submerged, were comparatively limited. At an early period, therefore, the attention of philosophers and mechanics was turned to the discovery of a contrivance for aiding the diver in prosecuting his perilous search, which was rendered all the more important from its being no longer confined to the acquisition of Eastern luxuries, but to the raising of treasures from sunken vessels, and, at times, the vessels themselves. A device of this kind, recently patented by an American, has attracted much attention among those interested in submarine exploration. It consists of a water-tight casing, of a size suitable to hold two persons. The side frames have angular flanges bolted together, and transparent panels fastened in the frames. Electric lights are also held in the casing, which are operated by wires from above, as is also the air supply by tubes. By a system of signals by the occupants the diving-bell can be moved around at all points of the wreck, thus allowing a full survey of its position, condition, etc., as well as determining the best means for recovery of the whole or any portion of the same.

### Hears Better than the Ear.

A MACHINE or device has been invented which will hear better than the human ear. It is called the eophone, and the United States Government has just concluded a series of very successful tests of the instrument aboard the battleship *Indiana*.

By means of this novel device, which is placed on the top of the pilot house of a vessel, it will be possible to hear sounds from another vessel so far away that any noise that might be made aboard of her less than the report of a shot of cannon would not be audible to the ear upon the vessel which contained the eophone.

The primary purpose of the invention is to prevent collisions between vessels in time of fog and at night by warning them of each other's presence, and in like manner to prevent shipwreck by warning vessels of the proximity of a dangerous shore.

The eophone is intended first to include the production in the water of certain sounds which constitute intelligible signals by means of suitable appliances upon a vessel or connected with the shore, as the case may be. In the second place it is for the transmission of these sound signals by and through the water to distances limited only by the intensity of the sound. The third point is that the invention provides for the reception of these sound signals out of the water by the invention itself.

The eophone consists principally of a plate, preferably of metal, whose area ranges from several square inches to several square feet. This plate serves as a diaphragm to a resonance chamber, whose other sides may be of any suitable material, and whose shape and size may be suitably varied to adapt the structure to the special conditions of its use. Connected with and projecting from this resonance chamber are one or more ear tubes leading to any place in the vessel which may be desired. These tubes act as sound conductors.—*N. Y. Herald*.

### Strength-Testing Machine for Heavy Beams.

ONE of the most interesting purposes for which the wonderful strength-testing machines at the Massachusetts Institute of Technology is made available is that of testing large beams, columns, etc., for buildings, with the minutest accuracy. Formerly the strength of wooden beams was ascertained by builders by testing small pieces of the same kind of wood and then calculating the strength of the beam by what these small sections exhibited. In making such calculations the small pieces tested were taken perfectly clear and free of knots, and allowance was made for the weakening of the beams by the imperfections in them. As a result of the tests made originally at this institute on entire beams, it was shown that this allowance was not nearly large enough, and that really beams had thus been figured on to carry loads which would bring them dangerously near the breaking point. Tested by this machine, great timbers, after resisting to their utmost, bend upward and then break with a tremendous, rending crash.

### Rotary Washing Machines.

CONSIDERABLE discussion has been taking place among French laundrymen as to the merits or demerits of rotary washing machines. The rotary principle is utterly opposed to the local habits, and hence the rotary machines have been considerably criticised, but nevertheless they have been adopted in all the municipal and hospital laundries. Several of the largest trade laundries have also been fitted up with American rotaries, or French imitations of American machines. It was lately declared that rotaries effect a saving of 50 per cent., and one large official laundry which could only deal with 2,000 kilos of linen a day by the old system now, that it has new machinery, handles easily 3,500 kilos.

### New Use for Waste Mica.

THE waste which forms so large a percentage of the output of mica mines has now a value, though no doubt a small one, as compared with that of the merchantable sizes. It is being utilized as a material from which to manufacture coverings for boilers and steam pipes to prevent or lessen the loss of heat by radiation, mica being a good non conductor of heat as well as of electricity. The demand for insulating purposes in the latter has grown immensely in the past few years.



### Force of Water Under High Pressure.

THE handling of water under the enormously heavy pressures obtained in many Western water-power plants is a very interesting problem. In the Fresno, Cal., water power plant, where Pelton wheels are used under a head of 1,411 feet, the following interesting phenomena are described by Mark A. Replogle: "A sudden stopping in the water-flow, on one occasion, raised the hand on the pressure gauge to the astounding height of 1,000 pounds per square inch, and the pressure returned to nearly a like distance below 610, and kept up reverberating for over thirty seconds. The great pipe writhed like a huge serpent, and the commotion in the interior sounded like the firing of distant cannon. The great strength and elasticity of the steel are the only safeguard in such sudden changes of flow. The water is applied to the Pelton wheels by the use of deflecting nozzles. A stream of water from one of these will bore a hole through a 3-inch plank in a few minutes; it will tear a hole through a  $\frac{3}{8}$  inch piece of steel in a few days; concrete melts before it like sugar.—*Electrical Review*.

### Machine to Take Shorthand Dictation.

EXPERTS commonly take dictation directly upon the typewriter, but it requires more time than to take it in shorthand as each letter must be struck to form the words. A new machine which is creating a furor in London has but six keys, the characters thereon forming combinations which express whole words by a series of dots and dashes easily read. It prints directly upon a roll of paper, making regular lines, beginning and ending automatically without attention from the operator. Unlike the typewriter, this new machine is almost noiseless so that it can be used in the courtroom. It is also small, 8x7 inches and about 4 inches high, and comparatively inexpensive. All the marks are plainly made and are always the same so that the work may be readily transcribed by another; this is rarely the case with ordinary shorthand notes, which can seldom be read by another owing to the individual peculiarities of stenographers.

### New Flying Machine.

A FLYING machine designed to imitate bird flight, and somewhat similar in principle to that of the unfortunate Lillenthal, has been a subject of experiment by Herr A. Stentzel, of Altona. The wings have a spread of about 7 yards, with a surface of  $8\frac{3}{4}$  square yards. They have a parabolic curve of 1 in 12, and move through an angle of 70 degrees. The apparatus weighs 75 pounds. The engine is of special construction, using compressed carbolic acid, and yields one horse-power with a pressure of five atmospheres and two to three horse-power with seven to nine atmospheres. It is claimed that the machine cannot only fly but that its speed can be varied at will.—*Industrial World*.

### The Costliest Thing in the World.

THE announcement that charcoal thread used as filaments in incandescent electric lamps, costing about \$12,000 a pound, was the dearest substance in the world has elicited considerable discussion. A Chicago authority states that gallium is vastly more expensive than the carbon filament,  $1\frac{1}{2}$  grains of it being worth \$25, or about \$100,000 per pound. He also furnishes a list of the rarer metals, with their approximate prices per pound:

Beryllium and lanthanum .....	\$10,000
Rhodium and thorium .....	6,000
Didymium and rubidium .....	4,000
Indium and tantalum .....	3,500
Erbium, niobium and yttrium .....	3,000
Rhutenium and vanadium .....	2,000

—*Exchange*.

### Typewriter and Computer.

THE typewriting machine, now an inseparable part of every business office, is to have its sphere of usefulness largely extended by its combination with a computing machine. Any approved adding, calculating, or computing machine is employed, being so placed between the legs of the typewriting machine as to enable the operator to see the computing machine's sight holes, through which the amounts being added and registered by said machine are exhibited. The invention will be especially useful in banks, clearing houses and wherever addition and computation and typewriting are to be done on the same piece of paper.—*Boston Journal of Commerce*.

### New Damper Regulator.

A SIMPLE and ingenious form of damper regulator has been adopted by the Allen Print Works, Providence, R. I., and the Pawtucket Gas Company, which is said to give very uniform steam pressure—in some cases reported as registering within half a pound of steam, while in others the variation does not exceed one pound. This apparatus is double acting and makes a partial stroke in both directions by water pressure, which should be at least forty pounds to the square inch; weights being set at the steam pressure desired, levers connected with the damper are at half stroke and the damper is half open. When the steam rises the levers rise correspondingly, and by connection open a port in a cylinder, water forces a piston up and moves the damper to a closed position, and, should steam continue to rise, a partial or full stroke is made—with falling steam the reverse action taking place. On an average a quart of water per hour is used.

### Machinery Notes.

—A steel "chest protector" against bullets and knife thrusts, in the form of a vest, has been patented by a Texan.

—Of the 100,000 tons of steel rails recently exported from the United States 50,000 tons were sent to England, 25,000 tons going to the London and South-western Railway Company.

—A machine has just been invented for the production of duplicate statuary, the mechanism consisting of a system of revolving cutters attached to frames operated by a tracer running over the pattern.

—A Wall street export firm, identified with the Japanese trade, has placed as large an order for builders' hardware for prompt shipment to Kobe as has ever been known to be bought for that market.

—The Carnegie Steel Company, Pittsburg, Pa., U. S. A., has been given the contract for the first steel building to be erected in Japan. It will be erected at Tokio, and contain 1,500 tons of American steel.

—The contract to build the Jalapa-Cordova Narrow Gauge Electric Railway (Mexico), to be 25 miles long, it is reported, has been awarded to J. J. Moylan & Co. and the Albion Construction Company of Chicago.

—The Beloit Iron Works, Beloit, Wis., have shipped a large papermaking machine to the Yokkaichi Paper Company, Japan. It is claimed to be the first machine of the kind to be sent from this country to Japan.

—The Webster, Camp and Lane Company, of Akron, O., will soon ship to Johannesburg, South Africa, two large electric hoists. They are of 300 horse-power each, and are for use in the mines of the Consolidated Gold Fields Company.

—A Hanover square export firm lately placed orders for two narrow-gauge locomotives, a quantity of track materials, together with a large portable boiler and engine for agricultural purposes. The total amount of the transaction is given at \$15,000. All this material will be shipped to South America this month.

—The E. P. Allis Company, Milwaukee, are completing two vertical compound beam blowing engines, with steam cylinders 40 and 78x60 inches, and two air cylinders, 76x60 inches, for the Krainische Industrie Gesellschaft of Trieste, Austria.

—Consul Ridgely writes to the State Department from Geneva, Switzerland, that there is evidence of at least a small demand in Geneva for American tin plate—that is to say, for the raw material packed in boxes; also, for black sheets packed in bundles.

—A forwarding agent has been asked by a St. Louis machinery firm to obtain lowest freight rates to Liverpool on two carloads of machinery. The items given are said to be saw mills and other wood-working machinery which have been ordered directly by parties abroad.

—One week the aggregate shipments of three of the leading export houses to Australia on manufactured iron goods and machinery were, it is estimated, upwards of \$45,000. It is reported on good authority that this year's business on this class of goods will far exceed that of 1896.

—Another rare metal has been discovered in monazite sand. The new element is said to make excellent incandescent mantles, and it has been suggested as possible that the new metal may prove a means of circumventing the Welsbach patents. The name of the new element is lucium, and its atomic weight is put at 104.

—Cloth buttons are machine made, a very intricate piece of mechanism stamping the metal, then cutting the cloth, placing it in position, drawing it over the button and putting the cap in place, leaving a projecting portion of cloth in the centre for the thread. Rice buttons are made of the white earth used in chinaware.

—K. Okazaki, of Tokio, Japan, member of the firm of B. Nakamura & Bros., having two iron works, one at Fukagawa and the other at Tsukishima, visited Pittsburg, U. S. A., recently, making contracts for oil-well equipment of various kinds for shipment to Japan. It is understood that several nice orders were placed with Pittsburg concerns.

—Could all of the energy be extracted from a single pound of coal and made to do mechanical work, this work would more than equal a day's labor of a very strong man. In the great coal fields that are distributed over the surface of the earth Nature has stored a supply of energy safely estimated to equal the hand labor of the entire population of the world continued for 1,000 years.—*Dr. W. W. Jaques*.

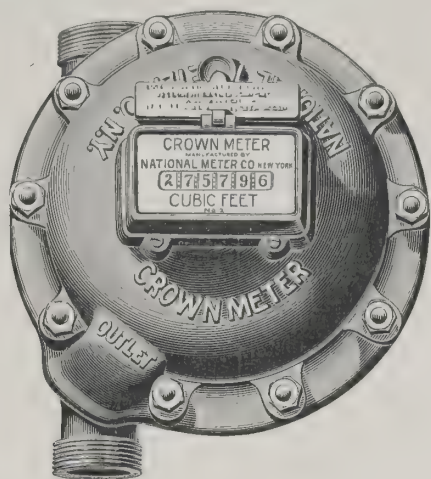
—The steel freight car, says the *Railway Gazette*, is a coming institution. Improved processes of steelmaking and the lessening of costs have made the steel car an available economy. In the saving of dead weight and repairs, lasting qualities and exemption from fire hazards and eligibility for increased carrying capacity it has everything in its favor. Its general adoption seems to be but a matter of time, and the traditional type of wooden car, as it ceases to pay for the cost of repairs, will make way for its steel successor.

—The Japanese Government has awarded to A. & P. Roberts (the Pencoyd Iron Works) of Philadelphia, Pa., U. S. A., the contract for 2,000 tons of structural bridge steel, to be delivered in the form of 186 steel spans of varying length for the Imperial Japanese Railway. The importance of the contract lies not so much in its magnitude as in the fact that it was secured in competition with the largest and most prominent manufacturers of structural steel in Europe as well as this country. The contract calls for the completion of the work in 1897.



Interesting Information for Water Works Officials about

# WATER



# METERS

They measure correctly the amount of water passing through a pipe.

**They increase the revenue,  
Restrict the waste,**

and assist in maintaining a uniform pressure in the water main.



We have many letters of similar character, copies of which we would be pleased to mail you.

## NATIONAL METER CO.

298 BROADWAY, NEW YORK.

**The Largest Water Meter Manufacturers in the World.  
Over 178,000 in Service.**

[APRIL, 1897]

City of Highland Park, Illinois.

NATIONAL METER CO.,  
298 Broadway, New York.

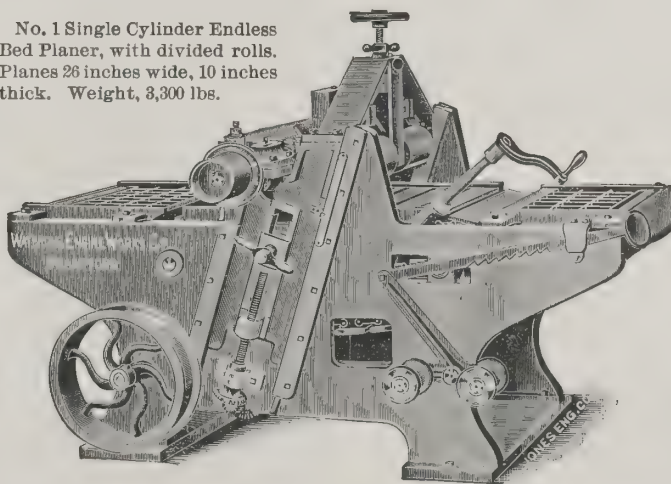
GENTLEMEN:

Replying to your favor of the 3d inst., would say that the city of Highland Park adopted the meter system in their water works in the winter of 1894-95. The result has been a material increase in revenue from the system, and a decrease in pumpage of at least 40 per cent. The water takers are well pleased with the service, as each pays for what he actually consumes. The city derives another advantage from the fact that leakage is quickly discovered, thereby increasing the economy of operating the system. Our experience has fully satisfied the most skeptical that meters soon pay for themselves in increased revenues on the one hand, and reduced cost of operating on the other.

Yours very truly,

J. C. CUSHMAN.  
Chairman of Water Committee.

No. 1 Single Cylinder Endless Bed Planer, with divided rolls. Planes 26 inches wide, 10 inches thick. Weight, 3,300 lbs.

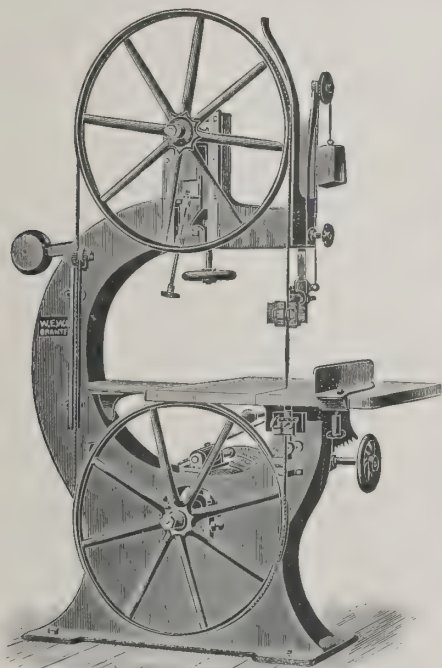


## Wood-Working MACHINERY.

No. 1 E. B. Planer. Weight, 3,300 lbs.; like cut.  
No. 1 Double Cylinder E. B. Planer. Weight, 5,300 lbs.  
No. 2 E. B. Planer. Weight, 2,600 lbs.  
"Champion" Combined Planer, Matcher and Moulder.  
Planes 24 inches wide up to 6 inches thick. Best all-around machine.

MANY OTHER STYLES AND SIZES,  
AND FULL LINE OF  
WOOD-WORKING MACHINES.

Long experience in the export trade is  
a satisfactory guarantee.



No. 3.—36-inch Wheel. Weight, 2,000 lbs.

## BAND RE-SAWS.

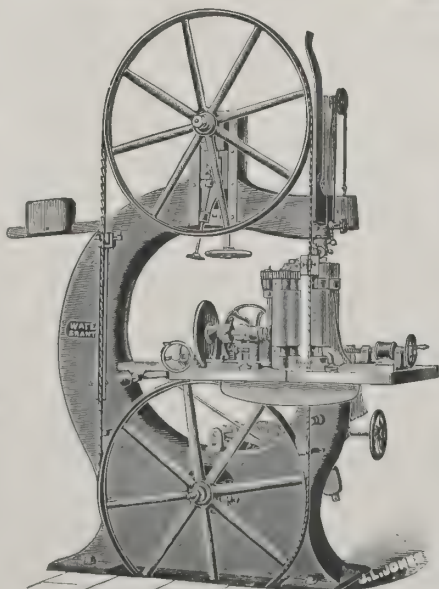
No. 5 Band Resaw.—48-inch wheels; saws 24 inches wide, 5 to 40 feet per minute. Resaw swings clear of machine when required. Weight, 4,500 lbs.

No. 6 Band Resaw.—48-inch wheels; takes saws to 3 inches; cuts 30 inches deep. Weight, 4,300 lbs.

No. 7 Band Resaw.—54-inch wheels; 4-inch saws; cuts 30 inches deep and to center of 10 inches. Weight, 5,300 lbs.

OTHER SIZES MANUFACTURED.

FULL LINE OF  
**Saw Mill Machinery.**



No. 4.—40-inch Wheels and Removable Resaw. Weight 2,750 lbs.



1844.

NEW  
PREMISES.

1896.

January, 1896, we moved into new premises, securing unsurpassed facilities for executing contracts promptly and satisfactorily. Order direct or through your commission house, sending us copy of order.

**Saw Mill Machinery Our Specialty.**

There are some 300 of our saw mills running in South and Central America, Europe, Asia and Africa, of different sizes, from those cutting logs 6 feet in diameter to small mills sufficiently portable for mule-back transport.

# WATEROUS, BRANTFORD, CANADA.



### Trade with Australia and Foreign Competition.

MR. J. E. BRISCOE, of the firms of Briscoe, Drysdale Co., Sydney and William Briscoe & Son, London, having recently returned to this country on a holiday from Sydney after an absence on this occasion of three years, has favored us with some views on the present position of trade in Australia.

American, German and Belgium competition with English goods offering in New South Wales, Victoria and other colonies continues severe. How it is to be met is somewhat difficult to see, since the foreigners, having once obtained a pre-eminence in certain lines, are making immense efforts to hold their position, and with a wonderful amount of success. It is not altogether a matter of prices as between the various countries, but style of parcelling and general get-up tell considerably. The circumstance, too, that any particular nationality has a pre-eminence in any special goods leads to that country putting every effort in the way of adopting increased facilities for cheapening production, and therefore their prices are likely to be less than those of competitors doing a similar business.

Axes are a line in which the Americans still absolutely hold the field, and I see no prospect of their being displaced. The American success is not, in my opinion, wholly to be traced to superior tempering of their tools, or such like conditions, but is largely attributable to the circumstance that, being themselves a timber-producing country, they have had immense experience in the employment of the axe, and in this way have come to realize exactly the shapes and conditions which should attach to felling and similar axe production.

In locks, Willenhall fairly holds the trade in rim and certain classes of mortis goods and Wolverhampton in cabinet-locks, but for the lighter class of door-locks the United States locks continue to find a good Australian market. Particularly is this as regards the "Yale" latch, which is used throughout the entire colony, being a great favorite on account of its neatness, and the small flat key which is all that is necessary to open it. As regards the American locks generally, neatness and superiority of parcelling are peculiar features. In blind rollers, the "Hartshorn" blind-roller from America carries everything before it.

In reaping machinery, or to speak more accurately, in strippers, the American patterns have the field almost wholly to themselves. In making inquiries from some of our English implement makers why this should be so, I am informed that there are not sufficient opportunities in this country for testing such machinery when brought out, and therefore makers are unable to perfect it to anything like the same extent as that of the American production, where, as in Australia, such great areas of the wheat crop are gathered merely in the form of the ears, the straw being left on the ground either to be burnt or to be ploughed in as a fertilizer. Under these circumstances I fear that this trade will continue in the hands of the American implement-makers, and I need scarcely remark that it is a very profitable and valuable one.

Speaking of the tempering of tools, in which the Americans are by some people supposed to be ahead of the English, it may be well to point out that this is by no means always the case; and, as showing that Sheffield manufacturers can produce a temper equal to anything in the world, I may illustrate that a Sheffield cutlery manufacturer recently assured me that a German hollow ground razor professing to have been made in Germany was proved by himself, by a careful inspection of the mark it bore, to be of Sheffield workmanship! Hence you see the Germans, and perhaps some other nationalities, sometimes get credit for excellence that is not their own.

Sheepshears are a wonderful example of the manner in which English manufacturers hold their own. In this business our home makers have the absolute control. Burgon & Ball and the T. U. S. shears, both of Sheffield make, are without rivals in the colony, and are likely to remain so. The manner in which the T. U. S. shear has obtained a footing is absolutely unprecedented. In consequence of being exclusively made by trade-union hands on the co-operative principle, it has secured, without expense in the matter of introductory outlay and travelling, a patronage which is absolutely amazing. The trade-union societies in the colonies took the shear up, and simply floated it in a manner which, speakably roughly, was almost incomprehensible.

Lampware we import in great quantities from the States of that designed for the larger and more powerful lamps. In this class of hardware the Americans are now competing severely with the Austrians and Germans and with a large amount of success.

In sporting guns the Birmingham people are meeting the Liège competition very satisfactorily, but the Belgian and German glassware is unrivalled. In fencing wire the Belgian competition continues very marked. The foreigners originally got their foot in in consequence of the admirable way in which the wire was sent out. Their style of supplying it in coils very easy to handle was so much admired that it at once caught on, and ever since has had a big business and I should say would never be ousted.

While I am no upholder of American competition against English goods, still I must remark that, when it is borne in mind that the freight from America to Australia for hardwares and dry goods is higher than it is from this country, in consequence largely of the lesser bulk of trade doing from America as compared with England, the market which America has been able to establish in Australia for certain of its productions is certainly very creditable. There is still an inclination among hardware consumers and merchants in Australia to look towards America as the market of cheap supplies, and to keep an eye upon her as likely to offer further selling lines which may be very acceptable. I attribute much of the American success to their labor-saving machinery and to the manner in which they handle their productions less in the course of manufacture than is the rule with us. Steel joists and girders for building purposes are a striking illustration in point. In the States these joists are turned out in a

way which causes a minimum of handling. It is to this same cause that, in my view, must be attributed the absolutely remarkable circumstance of the present importations of Bessemer steel billets and tin bars into England from Messrs. Carnegie's and some other American steelworks at prices which the English makers cannot touch.

We are apt to scold the British manufacturer and call him conservative, pig-headed and all that sort of thing and he is always alleged to be blundering and making mistakes. Yet whenever anything good is to be had in the way of orders he is always "there," and, notwithstanding any competition, we get the bulk of the trade and are always ahead of everyone else in the whole world. Nevertheless, British manufacturers must not be above paying attention to details and receiving hints from merchants when necessary, and acting upon them."—*Iron Monger, London.*

### Trade with Italy.

IN an official English report regarding trade with Italy there are a number of suggestions of advantage to the manufacturers and merchants seeking export trade in that country. The report says in part: "As the result of a careful inquiry I would venture to suggest that the following are among the more important facts: German competition, offering quotations in Italian currency, the seller taking the risk of exchange, quoting for delivery at the place for consumption, all charges, including duty, paid, systematic inquiry concerning the commercial standing of all likely buyers, so that credits are given with fair security, rapidity and certainty in date of delivery; lowest quotations. There is a constant demand for reaping and mowing machines and hay rakes. They are almost universally of American manufacture, while plows, drills and other small machines and manufactured goods are generally of German or Swedish origin. The only way to properly obtain Italian business is either to send a traveller at least once a year, or to appoint well-recommended representatives in certain districts. Asking consuls for information regarding mercantile transactions is putting a consul in a difficult position. There is a market in Italy for any quantity of manufactured goods, of which Germany is certainly enjoying a monopoly. Some of the large agricultural machine makers in the United States have established depots for their machines in Liverpool for the purpose of more rapidly meeting the demands of Continental buyers. There are many other manufactured goods which would sell in Italy, but they require as much pushing as the agricultural machinery makers give their products."

### Increasing Export Trade.

THE increase in the export trade of the United States is attracting the attention of the countries heretofore enjoying a monopoly in supplying other countries with products of mill and workshop, for that of farm, forest and mine. The increase in exportation of goods made in the United States for 1896 is without a parallel in the history of American commerce. The increase of 1896 amounted to \$45,000,000 over 1895, the total sum being \$228,571,000, by far the greatest in the history of the country. The exports of manufactures to all other exports is also by far the highest yet reached, more than 26 per cent.

American tools, American machines and American manufactures, which constitute a large proportion of our exports, are naturally followed by American engineers, superintendence and practice. The development of mining rail road building, electric traction, power and light installations, and of civil, municipal, sanitary and mechanical engineering work, are but in its infancy in the newer countries of the world. The introduction of American machinery will open almost limitless room for American engineering enterprises.

Our capitalists, too, are seeking franchises abroad, in Asia, Africa and South America, and knowing the value of American skill, American tools and machinery, seek first to have their demands supplied here. English trade journals are filled with descriptions of wonderful special machinery contrived by their cousins across the water. Light machinery, special tools and American ingenuity are attracting world-wide attention, while in more cumbersome and heavy machinery the old continent is still allowed to hold the mastery.

Speed is the one requisite in American machinery. How many men can a tool or machine displace? is the first question asked, while in Europe the aim seems to be to continue as many at a task as possible. This will account for the cheapness of American-made goods over European stock, even though the wages of the mechanic and operator may be doubled in the United States.—*Pittsburg Commercial Gazette.*

### New Line of Steamers.

A COMPANY is about to be formed which will operate a line of steamers between St. Louis and Mexican and South American ports. For the present the boats will sail from New Orleans and Pensacola for Tampico, Mex., and ports in Venezuela, Colombia and the West Indies. The Ward Steamship Co. will be at the head of the enterprise, which will require an outlay of about \$2,000,000. It is expected that in the near future boats will be constructed to ply direct between St. Louis and the southern republics. The negotiations call for the beginning of traffic by May 1st.

—It is reported that the Brooks Locomotive Works, of Dunkirk, N. Y., have received an order for four locomotives to be exported. This with other orders which the concern have received will enable them to start their works full time as soon as the material for making the locomotives can be secured.



Absolutely noiseless,  
Immediate and strong siphonic action,  
With a cistern valve that can be regulated  
for any discharge,  
Every part constructed of best known materials and workmanship

DESCRIBES THE

## MAELSTROM

Water Closet,

which represents the greatest improvement  
in sanitary appliances, made by

## OWEN & SALTER

MANUFACTURERS OF

**Plumbing Materials,  
Lavatories, Baths  
and Water Closets,**

12TH AND BUTTONWOOD STREETS,  
PHILADELPHIA, PA., U. S. A.

Send for illustrated catalogue.



## JAMES H. TARR,

MANUFACTURER OF

Tarr's Celebrated

## Copper Paint

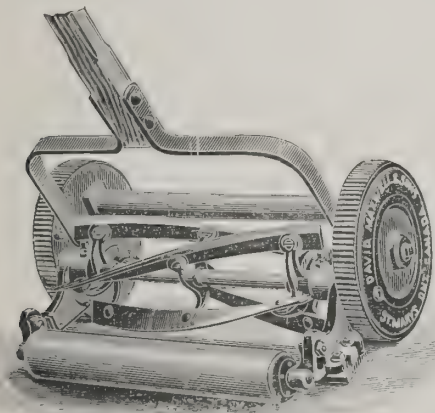
"Yacht Composition"  
AND  
"Green Racing  
Composition"  
for wooden bottoms.  
"Marine Iron" Paint  
for the bottoms of  
iron or steel vessels.

These Paints are acknowledged the best manufactured for their respective uses.

WRITE FOR CATALOGUE CONTAINING  
TESTIMONIALS FROM PARTIES WHO  
HAVE USED THEM.

Factory and Office, CLOUCESTER, Mass., U. S. A.

NEW YORK OFFICE, 41 WATER STREET.  
Telephone Call—No. 763 Broad.



## MAXWELL LAWN MOWERS.

HIGH AND  
LOW WHEELS.

The Latest and Most Perfect in the Market.

## IMPROVED FARM MACHINERY of all Descriptions.

SEND FOR CATALOGUE AND PRICES.

## DAVID MAXWELL & SONS

Manufacturers,  
ST. MARYS, ONTARIO CANADA.



METALS PERFORATED AS REQUIRED FOR

## SCREENS OF ALL KINDS

FOR USE IN

Milling and Mining Machinery,  
Reduction and Concentrating Works,  
Woolen, Cotton, Paper and Pulp Mills,  
Rice, Flour and Cottonseed Oil  
Mills,  
Sugar and Malt Houses,  
Distilleries, Filter Presses,

Stone, Coal and Ore Screens,  
Stamp Battery Screens,  
Brick and Tile Works, Filters,  
Spark Arresters, Gas and Water  
Works,  
Oil, Gas and Vapor Stoves,  
Coffee Machinery, etc., etc.

STANDARD SIZES PERFORATED TIN AND BRASS ALWAYS IN STOCK.

Main Office and Works: No. 218 North Union St., Chicago, Ill., U. S. A.

Eastern Office: No. 284 PEARL STREET, NEW YORK.

## C. A. WOOLSEY PAINT AND COLOR CO.

98, 100 and 102 Hudson St.,

JERSEY CITY, N. J., U. S. A.,

MANUFACTURERS OF

*Woolsey's Copper Best Paint,  
Woolsey's Domestic Kalsomine,  
Woolsey's Coach and Car Colors,  
Woolsey's Wood Stains, Wood Filling, etc.*

### Copper Best Paint

FOR THE PRESERVATION OF THE  
BOTTOMS OF WOODEN  
VESSELS.

TESTIMONIAL.

From DEVONPORT FERRY CO., Ltd  
Auckland, N. Z., May 20, '91

To C. A. WOOLSEY PAINT  
AND COLOR CO.,  
Jersey City, N. J., U. S. A.

Gentlemen—I have great pleasure in recommending Woolsey's Copper Best Paint. I have used it on my Company's steamers for a number of years past, and it has given entire satisfaction. The Devonport Ferry Company's steamers "Britannia," "Victoria," "Alexandra," "Takapuna" and "Tainui" are now coated with Woolsey's Copper Best Paint over Metal Sheeting. Faithfully yours,

ALEX. ALISON, Manager.

### "KALSOMINE."

Our Kalsomine is made of the best selected material and the tints and colors are particularly brilliant and clear. We are selling large quantities in the foreign markets with gratifying results. Send a sample order. You can make no mistake, for it is the best Kalsomine in the market.

### COACH

—AND—

### CAR COLORS.

GROUND IN JAPAN.

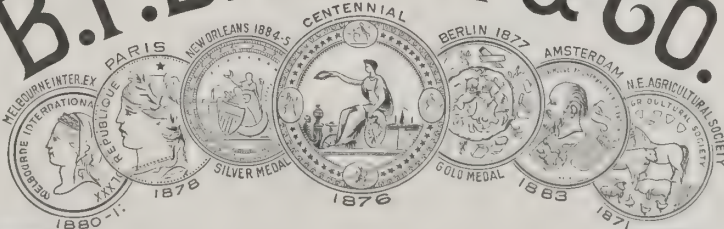
TESTIMONIAL.

CHARLOTTE, MICH.,  
March 17, 1890,

C. A. WOOLSEY,  
Dear Sir:—We have used your colors for the last two years and we like them better than any we have ever used. Your Black, Wine and Greens are very fine colors, being very finely ground and having a good strong body. Your Ruby Red, we think, is the finest Red in the market, and full as nice as Carmine.

Yours truly,  
MAT & BARNEY.

## B.F. BROWN & CO.



Manufacturers of the Celebrated

## FRENCH DRESSING

AND

## SATIN POLISH

FOR

LADIES' AND CHILDREN'S  
BOOTS AND SHOES.

MANUFACTURERS OF

## ARMY and NAVY BLACKING.

Boston, Mass. London, Eng.





### No Cut Glass Like American.

AMONG the practical arts which have been brought to a high degree of perfection in America, that of glass cutting is especially conspicuous. In the higher and costlier grades of cut glass scarcely any is imported. Europe does not produce anything that competes with the brilliant and beautiful wares turned out at the leading glass-cutting establishments of the United States. Glass cut in Bohemia is still imported to some extent, but it is of the cheaper kind and is bought because of its cheapness and for that reason only. The fact is that Bohemia has lost its prestige in glass cutting, and the palm of superiority is borne by America as against all competitors. American cut glass is, in the broadest sense, distinctively American. In designing and cutting it is the work of American artists and artisans. Originality and taste, progress and skill are the elements that characterize Yankee supremacy in this as in many other lines of native manufacture.

For several years past Europe has stood still while America was rapidly advancing in glass cutting. In the old country they are foggy and conventional in their ideas, and cling to old styles and designs. Here, on the contrary, the styles are new, progressive, and attractive. Nowadays America originates all the novelties in glassware, and has done more than all the rest of the world combined in broadening the scope of the art and in popularizing its products. To a large extent cut glass has displaced decorated pottery in the setting of a handsome table. Outside of the pieces which necessarily belong to a full china dinner set the fashion now is for as much cut glass as possible. Punch bowls, salad bowls, berry dishes, ice cream sets, vases, lamps, candelabra, etc., are now done in cut glass, where formerly ceramic ware was used. Possibly you are not aware of the wide range and variety of articles that are now included in a complete outfit of cut glass. In addition to those just mentioned, there are oyster bowls, orange and nut bowls, epergnes, champagne, claret, wine, whisky, and brandy jugs, decanters, cigar jars, tobacco jars, pitchers, tankards, oil bottles, mustards, syrup jugs, sugar sifters, carafes, small cheese and butter dishes, cheese covers and plates, pickle and biscuit jars, ice bowls, tubs and strainers, celery vases, butter tubs, spoon holders, celery dishes and trays, cake plates, bonbonnières, olive dishes, candlesticks, sugar bowls, cream jugs, tumblers and goblets, while cut-glass handles embellish ladles of solid silver, ice cream knives, and salad forks and spoons.

For vessels that are to be decorated by cutting, engraving, or etching flint glass is used. The manufacture of flint glass for cutting is old in America. As far back as 1812 the Crown Glass Company was producing flint glass in Boston, and in 1818 the New England Glass Company, also of Boston, had in operation two flint glass furnaces and twenty-four cutting wheels. Some of the cut-glass articles produced at these pioneer establishments are still in existence. In simplicity and crudity of design and execution they contrast oddly with the superb work of the present day.—*New York Sun*.

### Glass in Architecture.

PRACTICAL builders in large cities often refer to glass as a prospective building material. Demand for light, durability, cleanliness, strength and protection from fire insure its much wider employment in the near future. The protection offered against electrical disturbances and the possible casualties from the increased employment of electricity, is also open to consideration. Glass floors are in the line of progress, and the prospect is that there will be a demand for glass houses one of these days. Indeed, the demand for better-lighted apartments in closely built districts, made imperative by hygienic necessity, far exceeds the methods at present available.

A NEW armor steel has been invented by Samuel Maxim, the brother of Hiram Maxim, of machine-gun fame. Mr. Maxim, according to the *Philadelphia Record*, claims to have simplified the process of manufacturing the famed Wootz steel of India, still made by laborious crucible methods in that country. He submits specimens which are said to cut glass with ease, and says he can, by his process, much increase the resistance of armor plate while greatly reducing the thickness and weight.

IN Germany with all the improvements that have been made during the past ten years through the introduction of American shoemaking machinery—both genuine and imitated—boots and shoes are still relatively dear in this country, and imports of factory-made shoes, generally of inferior quality, have become quite active from Italy and Austria-Hungary. There is here an obvious opportunity which American shoe manufacturers will do well to carefully study and utilize.—*U. S. Consul-General at Frankfurt*.

A LOCAL forwarding agent who caters to the business of Western manufacturers doing direct export business, said: "The two best export-markets for Western goods are Germany and England. There is seldom a Hamburg or a Liverpool steamer leaving port that upwards of \$100,000 in various manufactured goods are not put on board by us. We are only one of many such shippers acting in behalf of manufacturers. This week we had 900 cases of bicycles, valued at \$50,000; 715 cases of agricultural implements, worth \$15,300, and many other articles which are too numerous to mention. The British market is equally as good, if not better, so far as good-size shipments from the West are concerned. We have on dock now upward of \$70,000 worth of merchandise for England, and were it not indiscretion on our part to say what and where they are it would be surprising to show the different classes of goods included thereon."

### A Photographic Invention.

A NEW photographic printing paper, for which many obvious advantages are claimed, has just been brought out by a Newark, N. J., company, under patents obtained by the inventors, who seem to have succeeded in accomplishing something for which photographic chemists have been striving for years without success.

Toning prints and making the result permanent is the one operation which has caused thousands of amateurs to give up photography in disgust. A few years ago little besides albumen coated paper, sensitized by floating upon nitrate of silver, was ever used in photography. This needed extremely careful handling and had to undergo coating, cutting, fuming with ammonia, printing, salting, washing, toning in gold solution, more washing, then trimming, mounting and burnishing before the finished print was ready to show. Then came a great quantity of gelatine-coated, ready sensitized papers, with considerable keeping qualities which albumen paper lacked. The gelatine papers were all apparently simple to handle, and ready mixed toning solutions were sold with them, but without knowledge and skill the amateur and professional alike found to his sorrow that he could not obtain a lasting tone, and there are few gelatine pictures a year old which have not faded or turned yellow if they have been exposed to light.

This was always the fault of the toning, and there were many other objectionable tricks which gelatine-chloride papers developed in the handling. Following upon the heels of the gelatine papers came the collodion chloride papers, which were slightly more permanent, but required the same careful handling in toning and the same knowledge of chemistry. The trouble was too much for amateurs, and many professionals fell back upon the old albumen process after giving the collodion a trial.

The new self-toning paper is a triumph over the ordinary vexations of handling prints. It is a "printing-out" paper and need be printed in the daylight only to the point desired in the finished picture. When this is done the print is thrown into a 10 or 15 per cent. solution of hypo (hyposulphate of soda) and left there until ready for washing. If it is printed properly the picture will not overtone or bleach out in the hypo, and washing for half an hour in running water completes the work. The pictures can then be blotted off and mounted at once.

This paper is coated with a collodion emulsion, in which the printing salts of silver and the toning salt of gold are ingeniously combined, and the gold has the advantage of being through and through the emulsion, and not a mere surface film upon the silver, as it is when prints are toned in gold solution after printing. This is said to insure the permanency. The inventors have been working upon the process for six years, and have a number of unchanged prints made two years ago before they had reached their present stage of perfection in the manufacture. They have sold patent rights abroad upon the indorsement of several of the highest photographic authorities there, and last week they began the manufacture of the paper on a large scale at the new factory in Vailsburg.

### The Largest Private House in the World.

IN the last century it was kings who patronized engravers, and it was the greatness of kingdoms and comparative riches of individuals that gave inspiration to achieve great results. Even the sight of a high mountain has led an artist to aim high. Americans are excited to labor for success by the magnificence of mammoth business establishments.

The enormous amount of printed matter, labels, signs, etc., used in the 200 branch houses of Armour & Co., located all over the United States, made it necessary to establish the Armour Printing Works at the Stock Yards. The latest and most improved machinery is here used, and printing of all descriptions is turned out in short order and in the highest style of the printer's art. The number of electrotypes used is enormous.

The business of Armour & Co. is well known as the largest of any private business house in the world. This recently exceeded \$100,000,000 in a single year. While prices ruled lower during the past year, and the total value of the sales would thus be affected, the record of the year's business shows that there has been sold as large an amount, in tonnage, as for any year in the history of the business.

There are employed in Chicago a force of men ranging from 6,000 to 10,000, which is in addition to the large force of the Armour Packing Company in Kansas City. Armour & Co. have 100 branch houses.—*The Engraver and Electrotyper*.

"THE export sales of Alabama pig iron," said a well-posted broker, "are reported to have shown a heavy increase during the first quarter of the present year which just closed, 50,000 tons having been exported during that period as compared with 100,000 tons for all of last year. Iron men are of the opinion that at this rate the exports for the current year will reach a quarter of a million tons. Shortly a big shipment will be made to Genoa, Italy, and another to Sydney, Australia, where Alabama iron producers have been able to underbid English furnaces. Iron masters at Birmingham say that but for the lack of ship room from Southern ports their export iron trade would be considerably larger."

—The Davis and Egan Machine Tool Company, of Cincinnati, O., have just received a large order from Stockholm, Sweden, for some 40 machines, amounting to about \$22,000; also a large order from Sheriff, Swingley & Co., of Johannesburg, South Africa.





## DR. J. C. AYER & CO.'S STANDARD FAMILY MEDICINES.

Approved by the Profession.

Full directions, in various languages, accompany each bottle of our medicines.

### Ayer's Cherry Pectoral,

For the rapid cure of Diseases of the Throat and Lungs.

### Ayer's Sarsaparilla,

For purifying the Blood and the cure of Scrofulous Diseases.

### Ayer's Ague Cure,

Warranted to cure all Malarial Disorders.

### Ayer's Hair Vigor,

For Restoring gray hair to its Original Vitality and Color.

### Ayer's Cathartic Pills,

The most valuable Home Remedy for all Purgative Purposes.

Prepared by Dr. J. C. AYER & CO., Lowell, Mass., U. S. A. Dealers liberally supplied with almanacs, show cards, and other advertising material.

THE WORLD-RENOVED

## "Perfection Water Elevator AND Purifying Pump."

A Sure Preventive against Malaria, Typhoid  
and Other Fevers.

### THE EXACT PUMP FOR YOU.

This Pump is guaranteed to purify the foulest water  
in well or cistern in 10 days' ordinary usage.

#### How does it purify?

Each bucket descends full of air and ascends full of water. For each gallon of water drawn a gallon of air or oxygen (the vital element) is circulated through the water from the bottom to the top. This not only thoroughly agitates, ventilates and purifies the water, but also forces a large supply of oxygen which is sufficient to consume all impurities or organic matter in the foulest water. It is an admitted fact by thousands using them that this Purifier is the only Pump that will destroy wigglers, water bugs and water lice, and make foul or stagnated water pure and sweet, removing all color, bad taste and smell. After a few days usage of the "Perfection," the old flatness and insipidity in water is replaced by a sparkle like that of a mountain stream. In fact, it will make bad water good, and good water better. Write us for catalogue and book of information on impure water.

Our No. 6 Perfection (family use), all complete with chain, for 17 1/2 ft. well or cistern, \$17.00

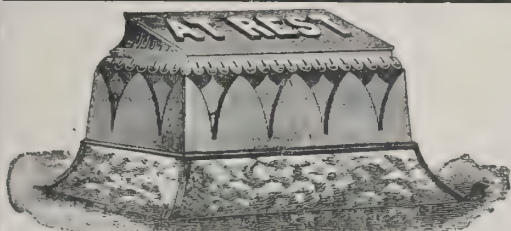
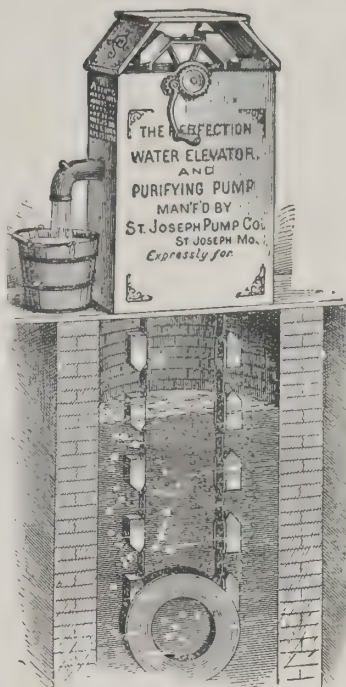
Our No. 6 Perfection (stock use), all complete with chain, for 17 1/2 ft. well or cistern, 21.00

For wells or cisterns of greater depth (family), chain per single foot, 30c.

For wells or cisterns of greater depth (stock), chain per single foot, 40c.

We will allow you from the above list prices a discount of 60 per cent., delivered for export shipment F. O. B. N. Y. City. If you mention this paper we will allow an additional 5 per cent. Please give us plain shipping directions and state what N. Y. Broker we shall draw on for our money. Address us and write your broker.

ST. JOSEPH PUMP & MFG. CO.  
ST. JOSEPH, MO., U. S. A.



Grave Marker No. 614.—Base 11x19 in., height 11 in.



Monument No. 181.  
Base 24 in. sq., height 3 ft. 8 in.

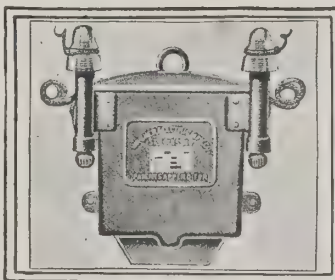
**THE VERY REASON** you buy a monument is the very reason why you should buy a **WHITE BRONZE** one—it perpetuates perpetually the memory of the dead. There is no disintegration or wear-out to it. **WHITE BRONZE** now has a test of over 300 years' usage, besides scientific tests, which prove its durability. **WHITE BRONZE IS A METAL** of a bluish-gray color and is so called to distinguish it from dark copper bronze. It is well adapted to countries where the climate changes suddenly and frequently. It will not crack or become moss-grown. It works up very handsomely in monumental form as is attested by the thousands in use. We ship most of them in sections for easy transportation through foreign countries.

Get our illustrated catalogue of over

**500 different styles of Monuments, Tombs, Statues, Tablets, Etc.** Mention this paper when writing.

It is sent free on request.

**PHILADELPHIA WHITE BRONZE MONUMENT CO.**  
33 So. 17th Street, Philadelphia, Pa., U. S. A.



We have courted and ENCOURAGED

COMPARATIVE TESTS, knowing that our Competitors alone had cause to fear them

REMEMBER, EFFICIENCY AFFECTS YOUR COAL PILE

The Cheapest Transformer is sure to prove the most expensive in the end

**WAGNER ELECTRIC MANUFACTURING CO**

GENERAL OFFICES AND FACTORY, ST. LOUIS, U.S.A.

WHEN WRITING US MENTION "THE AMERICAN EXPORTER."

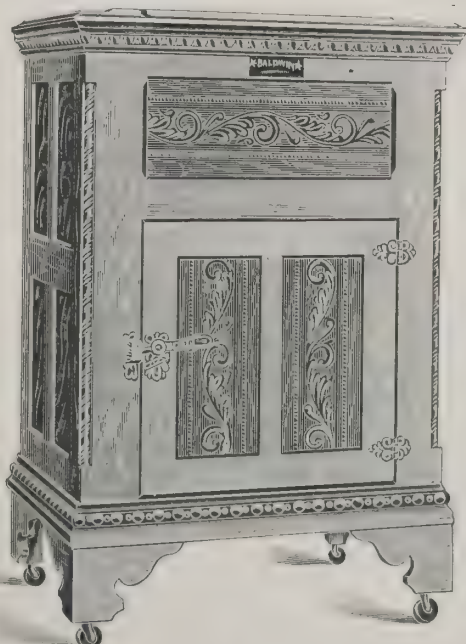
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110 Varieties,  
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Handsome Designs,  
Low Prices,  
Liberal Discounts,  
Prompt Shipments.

THE BALDWIN

Stands at the HEAD.



**THE BALDWIN REFRIGERATOR CO.,**  
BURLINGTON, VERMONT, U. S. A.

## New Jersey Copper Paint

LEADS THEM ALL,

So our testimonials say.

We guaranteed this Copper Paint to be the easiest to apply and, owing to its being so finely ground, it is the smoothest paint in the market.

Highest Medals from American Institute, New York City.

**NEW JERSEY RED COPPER,**

For yachts. Brightest color made.

**NEW JERSEY SEAM PAINT,**

A perfect substitute for pitch

**NEW JERSEY PAINT WORKS**

HARRY LOUDERBOUGH, Proprietor,

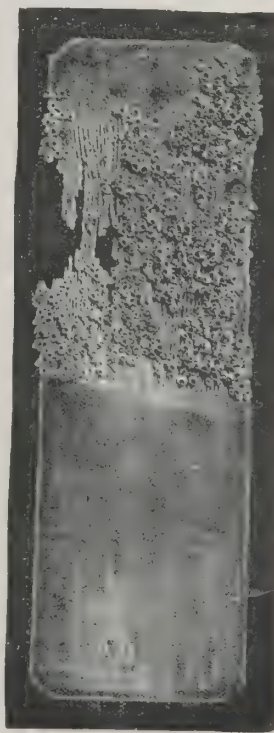
JERSEY CITY, N. J.

U. S. A.

### REMARKABLE FACT.

This cut is a copy of a photograph of a board having one end painted with **New Jersey Copper Paint**, manufactured by Harry Louderbough, proprietor of New Jersey Paint Works, Jersey City, N. J., U. S. A., and placed in the water at Port Royal, S. C., for five months. Upon the unpainted end you can note the ravages of the salt-water worm so destructive to wood, and also the large number of barnacles that have fastened upon it. Observe the painted end, where **New Jersey Copper Paint** was applied—it is splendid condition.

The board here represented was placed in the water at Port Royal, S. C., by me, and left in the water five months. The painted end was as good as when it was placed in the water.  
MILLS EDWARD,  
Master Schooner "Florence Shya."





## Weights and Measures—Their Origin.

DR. DANIEL G. BRINTON delivered a very interesting lecture before the Franklin Institute, Philadelphia, U. S. A., on "Weights and Measures Among Primitive People." The idea in the mind of the savage, as with civilized persons, in regard to mass and magnitude, he said, is simply relative. The unit of measurement is itself unknown. We commence at the unknown and proceed to a relative knowledge. The earliest accurate measurements in the Old World were based upon measurements of the precious metals. For a long time it was necessary to pay money by weight, and in the greatest money mart of the world to-day, London, it is weighed in the scales and is not paid by sovereigns. In all times a sense of justice has impelled man to regard weights as something sacred.

The measurements of length were in almost all cases taken from some portion of the human body, in Egypt, Babylonia, old Europe, Italy and throughout America. The simplest was a finger's breadth; the smallest the length of a finger nail. Usually it was the four fingers, making four different lengths. We still use the four fingers in width and call it a "hand" in measuring the height of horses. The fingers, three and four in breadth, and commonly used in country barrooms in measuring drinks. The "span" is from the end of the thumb to the end of the little finger, supposed to be nine inches. Many primitive Indians have three different spans, from the end of the outstretched thumb to the end of the great finger, or to end of the index finger, which is the Aztec span, or from the wrist to the end of the great finger. A common method has always been to measure across the clenched fist to the end of the outstretched thumb, two spans making a foot.

Linear measurements mentioned in the Bible are in cubits. This is considered to be the distance from the point of the elbow to the extremity of the great finger. There is a variation in the cubit, one measurement being only to the end of the first phalanges of the clenched hand. The Babylonian cubit measures about  $21\frac{1}{2}$  inches. There is the "arm's length," which in the Old World countries is measured from the centre of the chest to the end of the fingers. What is called the "great span," used by all nations, is the extremity of one arm to the extremity of the other. It is an important measurement. The "fathom," which means "the embrace," is what could be surrounded by the arms in a circular shape. This distance was always believed to hold a definite relation to the height of the individual. In a perfectly formed person it is the same as from the top of the head to the sole of the foot. Another measurement in Central America is a rope passing from under one foot to the outstretched hand, over the top of the head to the other hand and thence to the sole of the other foot. This rope spread out square is the fundamental unit for land measure of the Central American Indians.

The foot, 12 inches, is said to be the length of the foot of Charlemagne, who was nearly 7 feet in height. Then there is the "step," the "pace," the "stride." One thousand were supposed to make a mile, hence its derivation from "mille." It was the old Roman measure. The "furlong" is supposed to be as far as a pair of oxen could turn a furrow without stopping. A "day's journey," a common measurement in olden times, was from 15 to 18 miles.

All measurements of length and surface are of less accuracy than measurements of mass or weight. Although in Old America there were before the time of Columbus many nations on this continent who built magnificent cities, there was not among them a single method by which they could measure anything by weight, except a single mining tribe in Peru which had a simple, minute balance, which had been found in a tomb and which Dr. Brinton exhibited to the audience. It was for weighing gold. The Chinese sell everything, oil, silk, what you will, by weight. The earliest weight found in Egypt is the oldest weight found in Babylonia. It was multiples of 60. These weights were made of stones, a series of which the lecturer exhibited, found in Etruria, made probably of porphyry, round and flattened, somewhat like an orange pressed down. The Talmudic Commentaries prohibit using but a stone, as metal would wear away. Our ordinary steelyards, with a double fulcrum, came down to us from the ancient Romans. The Chinese also use a small double fulcrum balance for weighing precious stones and metals.

We find in different parts of the world lost civilizations, known by their buildings. A common portion or divisor has been discovered upon which the mound builders of Ohio erected their works, which is from 30 to  $30\frac{1}{2}$  inches long. A similar proportion is found in the monuments of the people whom the Aztecs dispossessed in Central America and Mexico, about  $31\frac{1}{2}$  inches. Monuments scattered throughout France, Spain and England, which are called monolithic monuments, were constructed on a scale of  $21\frac{1}{2}$  or 22 inches. The pyramids were constructed on the cubit—*Philadelphia Ledger*.

MR. F. BERGMANN, Consul-General of Peru, has received an official communication, stating that the Government is to establish a permanent exhibition of machinery at Lima. The exhibition will be held in the Machinery Hall of the Exposition Palace, and will be open July 28, 1897. Important articles will be admitted free of duty through the various custom houses of the country upon the production of a bond guaranteeing the payment of the duties ordinarily levied upon such articles when they are not reshipped within a period of six months. The exhibition of the same article will not be allowed for more than six months without special permission of the government.

—The Springfield Manufacturing Company, of Bridgeport, Conn., are about to ship one of their large roll grinders to England. They also report having received an order for a large car-wheel grinder for the London Traction Company, London, England.

## New Idea in Bank Checks.

EVER since an unknown man raised a check from \$12 to \$22,000, and succeeded in cashing it at the Nevada Bank, and in escaping with the money, bankers have been on the lookout for a means of preventing such swindles, and men of an inventive turn of mind have been studying to devise a check that shall be proof against raising. One of these, Marion Leventritt, a capitalist of this city, has succeeded in perfecting a device which has received the unqualified approval of bankers, merchants and others. They have unhesitatingly subscribed their names to a statement that it will do all that its inventor claims for it. Mr. Leventritt has applied for letters patent, and will make a present of the use of his invention to the business public, but he will expect bankers to pay him a royalty.

The principle of the Leventritt check is similar to that of the blank forms used for money orders by Wells, Fargo & Co., with the improvement that the size and tint of the body of the check vary with the amount for which it is drawn. Thus the pink-colored paper is good for any amount up to \$10,000. The body is  $7\frac{1}{2}$  inches long. It is provided with seven coupons next the stubs, each  $\frac{1}{4}$  of an inch wide, and separated by the blank of the same width.

They read, beginning next the body of the instrument, "Not over \$500;" "Not over \$1,000;" "Not over \$2,000;" "Not over \$4,000;" "Not over \$6,000;" "Not over \$8,000;" "Not over \$10,000." The body of the check, with all the coupons torn off, is not good for more than \$200. Each coupon adds  $\frac{1}{4}$  inch to the body of the check. Bank checks for more than \$10,000, and up to \$40,000 are 8 inches long, white, and provided with coupons. For \$50,000 and up to \$90,000 they are blue and  $8\frac{1}{2}$  inches long. The coupons are similar.

The merit of the invention is said to lie in the fact that the body of the check cannot be lengthened nor coupons added after they have been torn off, even with the pulp process. Then, again, the swindler will have to risk much money to go into the business of raising checks for large sums. Thus in order to raise a check to \$20,000, he must buy one costing not less than \$15,000.—*San Francisco Examiner*

## Lake Michigan and Mississippi River Canal.

CERTAINLY one of the triumphs of modern engineering is the canal being built for the purpose of carrying the vast amount of sewage of Chicago into the Mississippi River, the main design being that the waters of Lake Michigan shall flow through it at the rate of 10,000 cubic feet per second, the intention being to have the sewage so diluted that no possible harm can occur to the towns by which it will flow. Among the most striking data of this immense work is that of its length, viz., twenty-eight miles. Where it passes through alluvial ground the width at the bottom is 202 feet; but the material taken out is of a widely varying character, ranging from a soft mud, so soft that it can be removed by pumps, to a mixture of sand, gravel, clay and boulders, which is cemented so firmly as in some cases to require blasting. But much of the excavation is through solid rock. The estimated quantities to be removed are 4,500,000 cubic yards of wet soil, 23,000,000 cubic yards of alluvial and hard soil, and 12,000,000 cubic yards of solid rock—nearly 40,000,000 cubic yards of excavation.

## February Trade—United States.

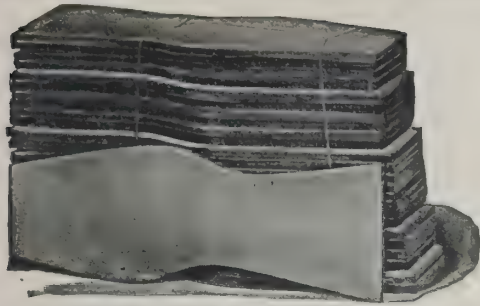
THE statistics published by the Treasury Department for February show that the exports amounted to \$79,773,398, against \$77,701,904 for the same month a year ago. For the eight months ended February 28th this year the value of the exports was \$734,950,525, compared with \$602,666,873 for the corresponding period of 1895-96. The imports for the month this year were valued at \$59,193,868, against \$62,478,116 in February, 1896. For the eight months ended February 28, 1897, the value of the imports was \$422,471,885, against \$541,194,833 in the eight months ended February 28, 1896.

THE Carnegie Steel Company has opened an office in Victoria street, Westminster, London, and announces that from its London office it is ready to make sales for the delivery of its material to any part of the world outside of America. This looks as if the recent invasion of the "markets of the world" by American steel is to be followed by permanent occupancy. Both American and German steel bars are now being used by the Welsh tinplate makers.—*Engineering News*

THE secretary of one of the leading elevator makers in this country said that this year they intended to work a new export field, and that was the Argentine Republic. He said: "So far we have only accomplished quite a great deal in the way of sending estimates, and in the near future we shall be able to decide just how much business can be done in this class of work, which is comparatively new for that country. We have, however, shipped this year three lots of elevators, the last lot being valued at \$17,000. If all that we hope to do turns out well a branch office will be opened in Buenos Ayres. By no means will we be the only ones there, as several European makers are already in that territory, and are doing quite well."

—An order was lately placed by an export house of this city for a quantity of cross-cut saws and jewelers' tools for Italy. The parties placing the order say: "These classes of goods have usually been shipped quite extensively from France to Italy, and an order of any size to be sent from this market is unusual."





American shoemakers and shoe-menders have got ahead of you. They don't buy whole sides of sole-leather now.

A shoemaker wants 2 or 3 grades and 4 or 5 thicknesses.

We cut sides, make 8 grades and 15 thicknesses, sell the cobbler the grades he wants, and the rest, including the waste, to somebody else, who wants that.

All well served; no waste; no using leather because you've got it.

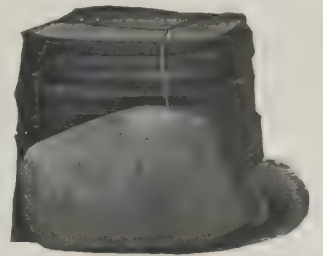
We do this business better than anybody else—it is a close wholesale business.

Do you want to know about it?

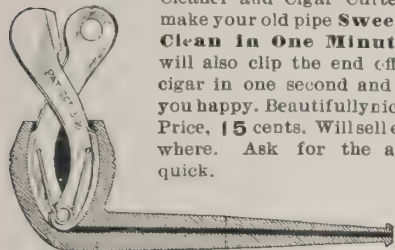
BAXTER SCHENKELBERGER & CO.,

350 Congress street, Boston, U. S. A.

50 Tabernacle street, London



## Do You Smoke a Pipe?



Our DIAMOND Steel Combination Pipe Cleaner and Cigar Cutter will make your old pipe **Sweet and Clean in One Minute.** It will also clip the end off your cigar in one second and make you happy. Beautifully nicked. Price, 15 cents. Will sell everywhere. Ask for the agency quick.

## 1,000,000 Diamond Safety Razors at 25 Cents each.

One for every man who shaves himself. Just to introduce our Diamond Steel Hand-Forged Cutlery, Knife Sharpeners, Skate Sharpeners, Scissors Sharpeners and Household Specialties into every home on earth.

THE DIAMOND KNIFE SHARPENER sharpens any carving knife, kitchen knife or bread knife in 10 seconds. It is the only article made that will sharpen the famous Christy bread knife. The Diamond Scissors Sharpener is wanted by all Barbers, Tailors, Dressmakers and every woman on the four continents. With the Diamond Skate Sharpener every skater sharpens his own skates. **THE DIAMOND SHARPENERS ARE THE ONLY SHARPENERS.** They all do the work quickly and well. **THIS WE WARRANT.** The price is 25 cents each the wide world over. Send your orders through any commission house.

DIAMOND CUTLERY CO.,

60 Broadway, NEW YORK CITY, U. S. A.



New York Offices and Warerooms,  
72 CORTLANDT ST.

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### Pumps for Every Service.

BOILER FEEDING,  
OIL PUMPS,  
TANK SERVICE.  
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Duplex Double Plunger Mine Pump.

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Send for New Illustrated Catalogue.

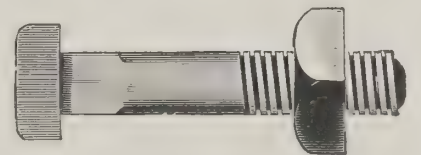
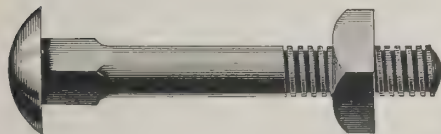
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## Carriage and Tire Bolts — Machine Bolts — Coach Screws — Stove Bolts.

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COLUMBUS BOLT WORKS,

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### Carriage Forgings of all kinds.

### The Largest and Most Complete Factory in America.

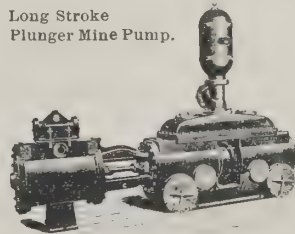
## HOOKEE PATENT

Pumps for Every Service.

MINERS' SINKING PUMPS A SPECIALTY.

BREWERY PUMPS A SPECIALTY.

Long Stroke  
Plunger Mine Pump.



## STEAM PUMPS.

Duplex and Direct Acting.

For Catalogue and Description, Address

HOOKEE-COLVILLE STEAM PUMP CO.

ST. LOUIS, MO., U. S. A.



2 1/2-inch Hand  
Card and Paper  
Cutter, \$12.00.

## CHEAP PRINTING!

EVERY MAN MAY PRINT HIS OWN CARDS, CIRCULARS, ETC.

SMALL HAND PRESSES, simply arranged with type for any language, by which any person can do good printing. Typesetting perfectly easy, to even a boy, with our printed instructions sent with every press.

### PRICES.

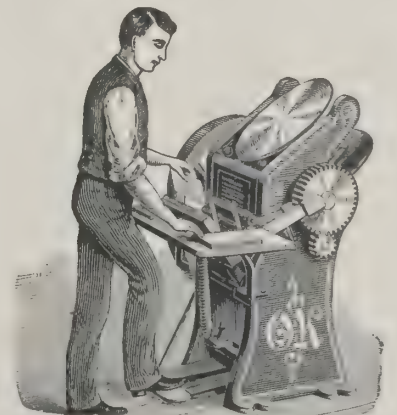
No. XX Press prints cards, circulars, etc., up to 5x8 inches. Complete with 7 styles type, ink, etc. Price, \$40.00. This outfit is entirely complete, ready for use.

No. XXXX Press prints up to 10x15 inches. With 10 styles of type, ink, etc., \$125.00. Or if \$50.00 be added for small type, rules, etc., a newspaper may be printed with this outfit.

Please write for our Illustrated Catalogue, by mail, of Presses, Type, Paper, Cards, etc., direct to our factory, near New York.

KELSEY & CO.

MERIDEN, CONN., U. S. A.



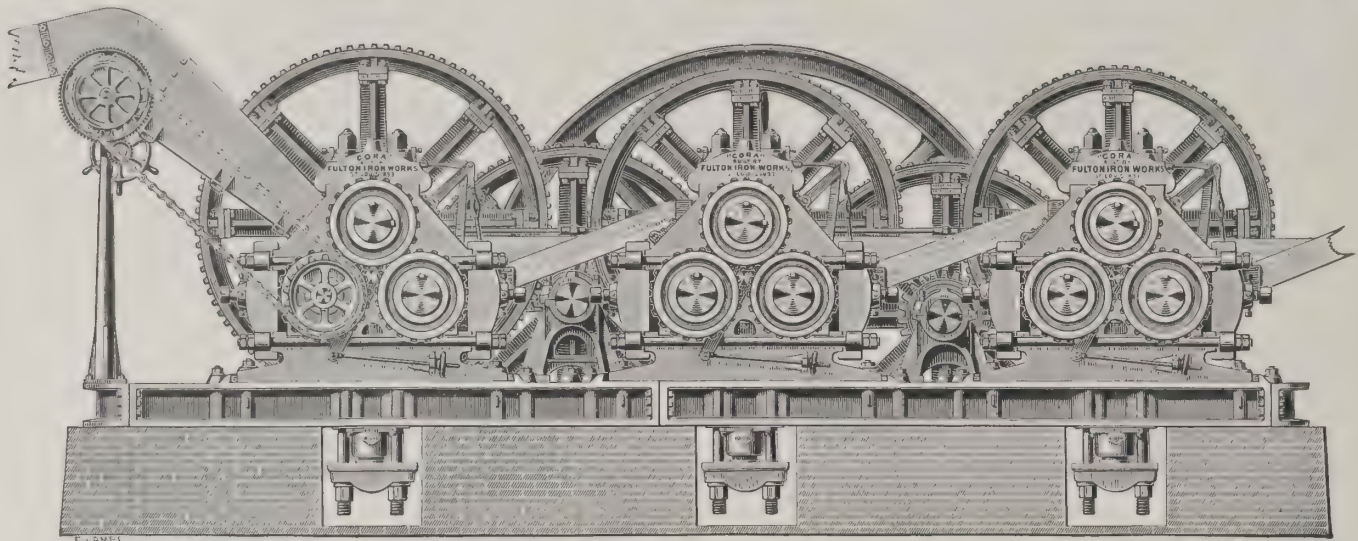
### THE O. K. PRESS.

A larger machine for fast work. Speed nearly 2,000 per hour. Chase, 9x13 inches. Weight, boxed, about 700 lbs. Price, only \$100.00. Price, \$200.00, if complete with type, ink, and all fixtures for general printing.



# "CORA" Nine-Roller Cane Mill.

CORRESPONDENCE SOLICITED.



ESTIMATES FURNISHED.

Built by **"FULTON IRON WORKS,"** St. Louis, Mo., U. S. A.

Per S.S. "COPTIC."

FULTON IRON WORKS, St. Louis, Mo.

HONOLULU, H. I., June 17th, 1895.

Dear Sirs: The nine-roller mill and Corliss engine built and erected for us by you last year has given perfect satisfaction, and we take pleasure in furnishing you with the following report covering work performed by it during the season just closed. Days grinding, 104 $\frac{3}{4}$ ; Tons of cane ground, 61,617.928; Tons of cane ground per day, 588.238. Extraction: 92.49 per cent. total sugar; 82.13 per cent. of cane; Dilution, 7.91 per cent.; Fibre in cane, 11.02 per cent. Average load on hydraulics, 313.2, 334, 344.5 tons.

It is hard to say just what is the capacity of this mill, as our boiling house is not of sufficient size to admit of a prolonged test, but we would say that we have ground on a short run over 50 tons of cane per hour, and with an increase of from 50 to 75 tons in the load on the hydraulic obtained an equally good extraction. We believe we have the best mill on the Islands.

Very truly yours,

EWA PLANTATION CO.,

E. D. TENNEY, Secretary.

## FLINT & WALLING MFG. CO.

KENDALLVILLE, IND., U. S. A.

Manufacturers for Export.

MANUFACTURERS AND DEALERS IN

Galvanized Steel Star Back Geared Wind Mills,  
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Galvanized Steel Towers, all heights,  
Iron Pumps, all kinds, furnished either Painted or Galvanized,  
with Polished Iron, Brass-Lined or All-Brass Working  
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Tubular Well Tools and Machinery,

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Wrought Iron Pipe

Hydrants and  
Street Washers.

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Work of all kinds.

Largest Factory  
in America for this Class  
of Goods.

Catalogues, Price Lists and  
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## MAST, FOOS & CO.

SPRINGFIELD, OHIO, U. S. A.

MANUFACTURERS OF

### IRON TURBINE WIND ENGINES.

**STRONG and  
DURABLE.**

Has stood the test in every civilized  
country on the globe.

**RUNS IN A LIGHT WIND.**

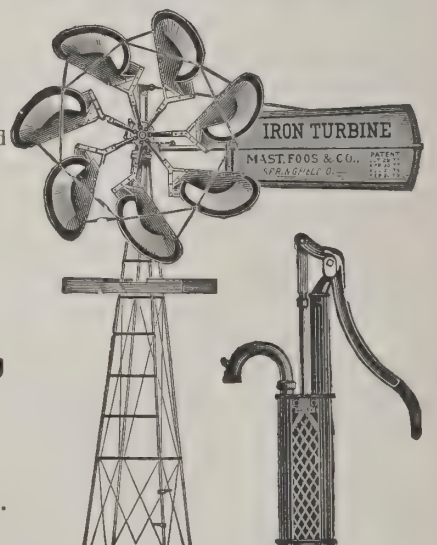
**BUCKEYE**

**Senior Lawn Mower,**

MADE IN

**10, 12, 14, 16 & 18 inch Cut.**

**STRONG, DURABLE,  
LIGHTEST RUNNING.**



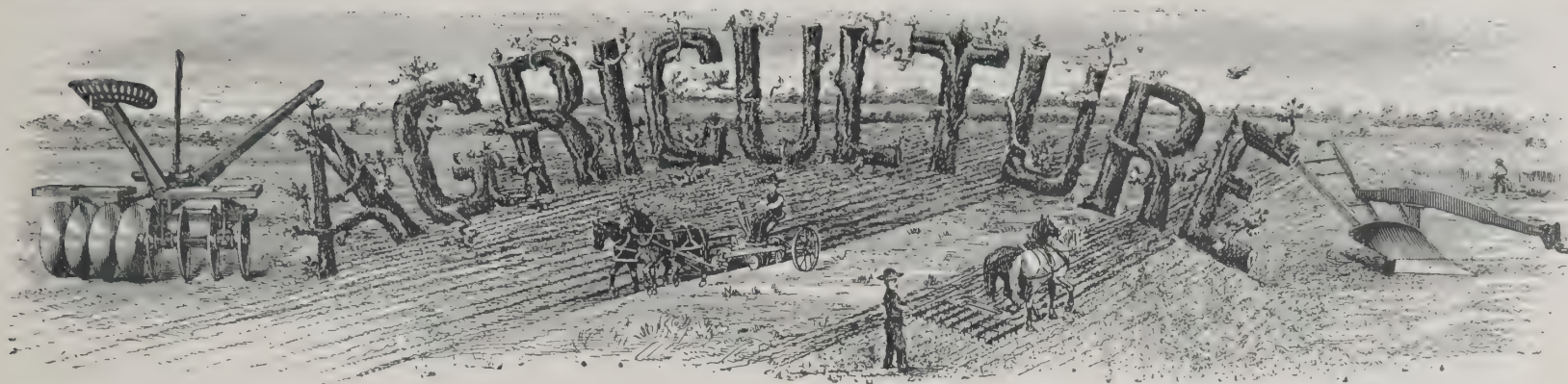
**Buckeye Force Pump.**

Works easy and throws a constant  
stream. Has Porcelain-lined and Brass  
Cylinders. Is easily  
set. Is the Cheap-  
est and Best Force  
Pump in the World  
for Deep or Shallow  
Wells. Over 300,000

in use. Never freezes in winter. Send for Circulars and  
Prices giving Depth of Well







DEVOTED TO THE FOREIGN TRADE IN AGRICULTURAL MACHINERY AND IMPLEMENTS

**American Wood for Asia.**

WHILE there has been for a number of years a growing American market for the finer qualities of wood from Asia (teak wood especially), the American export of wood to Asia was until about a year ago unimportant, says the *New York Sun*. Last year, however, China imported 13,000,000 square feet of American lumber, most of it from the States of Oregon and Washington. The year previous the total export of American wood to all countries were of the value of \$32,000,000. These exports included nearly 6,000,000 cubic feet of hewn timber and 330,000 feet of timber, together with joists, shingles, box-wood, doors, sashes and mouldings.

The chief foreign market for American lumber is the United Kingdom, as it is described in the Treasury report, but actually it is England, for there is very little exportation of American wood to either Ireland, which does not need it, or Scotland, which has wood in plenty. To Germany, Belgium and Canada American wood has been sent in fair but not large quantities, and the exports of manufactured wood, deals, boards and joists amounted last year to 726,000,000 feet. Lumber was exported to the Argentine Republic, and it seems curious to some persons to observe that several countries which have heretofore been regarded as sources of supply of the American wood market, Brazil, Honduras, Cuba, Colombia and Venezuela, should take in a year considerable supplies of American timber. With these South and Central American countries there is a considerable interchange of wood products, and from Mexico chiefly comes the American supply of mahogany, a wood which has been largely superseded for household and decorative uses of late by some of the hard woods from the almost inexhaustible Michigan forests. From these forests chiefly, with occasional additions from the Southern States, have come the American supply for export, but it has been found impracticable until recently to ship Michigan timber to Asia. Of late the enormous forests of Oregon and Washington States have begun to be more heavily drawn upon and, as the figures show, a market has been found for their woods in China. The forests of the State of Washington cover an area of more than 20,000,000 acres and the standing timber in that State is estimated according to the last figures, at the almost incredible total of 400,000,000,000 feet. Oregon, too, has enormous interests in forestry and with the improvement of railroad and steamship communications it is possible now for American lumbermen in these two States to compete successfully with their rivals across the northern border line. The Asiatic market for American lumber is now in the opinion of many persons, in its infancy only.—*The Tradesman*.

**Competition in the Argentine.**

CONSUL BRIDGETT, in his annual report to the Foreign Office on the trade of the Argentine Republic, refers to the competition of other nations, especially Germany, with England, with regard to manufactured goods. He says: Most articles have been in steady demand, and as showing the competition of other nations with English manufacturers, I may mention that Germany and Belgium have almost destroyed our trade in iron fencing, wire and iron girders. In cutlery, locks, hinges, tools and other branches of hardware trade England holds her own as regards quality, but other nations supply inferior articles at lower prices. A leading house in this branch of trade was recently approached by the agent of a German manufacturer with the view to supplying goods with English marks upon them. The firm, being of high standard and repute, very properly declined the offer. Agricultural machinery has been quite neglected, and steam threshing machines alone show a falling off of 1,200 in number, having in 1895 been only 122. The same remark applies to reapers. Importers have been selling these articles at credit of two and three years, and owing to failure of crops cannot collect proceeds of sale. So hard have importers been hit that a project of law was presented to Congress that machines, when not paid for, should be free of seizure for other debts, and for the coming season steamship agents at home report an absence of inquiry for shipment. This shows that imports are overdone and the market more than sufficiently supplied. American reapers and mowers are preferred to English makes, as the latter are too heavy and expensive.—*London Hardware Trade Journal*.

—A correspondent writing from Fernandina, Fla., says: "A shipment of 1500 tons of garden fertilizers was sent on a recent date by the Mallory line by way of New York to Auckland, N. Z. This is the first consignment of phosphate that has been shipped from Fernandina to that part of the world."

**American Brooms.**

AMERICAN brooms are exported in large numbers to many countries. Our exportations of brooms to some countries have within recent years, owing to natural causes, decreased; but our aggregate exports are, nevertheless, now larger than ever and still increasing. We send brooms to Central America, South America and South Africa, to the United Kingdom and to France and Germany. We sent many brooms to Australia; now we send few brooms there, but we send large quantities of broom corn, and we send there, too, broommaking machinery. American broommaking machinery is sent also to other foreign countries. At one time many American brooms were sold in the Argentine Republic, but now they are raising broom corn on the Plate River, and making brooms down there, too. We send, now and then, a little lot of brooms to China, but we send none, or practically none, to other Asiatic countries, and our exports to China are so small as to be of no consideration whatever in the account.

The climate of this country is favorable to the growth of broom corn, and here broom corn is cultivated with the greatest skill and with the best results. Considerable quantities of broom corn are raised in Italy, but it is of a poorer quality and it is commonly permitted to ripen too much, until it is red and lifeless and brittle. The Italian corn is made into brooms in Germany, where the labor is much cheaper than here; but that cheapness is offset by the effective use of machinery here. In this country even the corn itself is harvested and sorted by machines. American brooms of the lower grades are put down in Germany at prices that are very close to those of the poorer German brooms. The higher grades of American brooms cost more, but they are the best brooms in the world. They excel in durability and in all other good qualities. Some brooms are packed for export in boxes; but there are countries in which import duties are levied on gross weight, where a packing box would be too costly a tare; and brooms for export are commonly packed in burlaps, handles and all being completely covered.

We send no whisk brooms to Europe; there they still cling to the old-fashioned clothes brush. But to all other countries to which we send brooms we send whisk brooms, too.—*New York Sun*.

**Sugar from Cornstalks by Electricity.**

CONSIDERABLE curiosity is shown as to the organization of a new sugar company, as reported in the newspapers, with a capital of \$50,000,000, all of which, it was said by persons in a position to know, is intended to be used immediately, otherwise the company would not at once have paid the State the full fee of \$10,000 on that amount of capital named for the privilege of organization. An effort to conceal the real purpose of the corporation was made by alleging that the only object was to make use of the products of cornstalks, such as corn-pith cellulose for car wheels, etc., but the main object of the company, it is said, is to manufacture sugar by a patent electrical process invented by Mr. Marsden, not only out of cornstalks, but out of other raw material not specified, and that some of the well-known sugar refiners are really interested in the company. It has been demonstrated that sugar can be made out of cornstalks, and if the Marsden process for doing so by electricity proves to be an economic success as well, it may be a new departure in the sugar-refining industry.

**A Far-Away Shipment to Siberia.**

A ST. ALBANS, Vermont, U. S. A., Company, completed an order a few days ago for the shipment of 24 of their horse powers and threshers to Siberia. These machines were ordered through a firm in San Francisco and were shipped via that port to the Saghalien Island. This island lies off the east coast of Asia, and was formerly the property of Japan. The southern portion of the island was ceded to Russia in 1875 and some of the penal colonies of the Russian Government are established there.

The Company made a shipment of a few of these machines to the Saghalien Island about a year ago on trial. They proved so entirely satisfactory that the recent large shipment was ordered. As the machines were ordered from San Francisco, they have no direct knowledge of the purchaser, but it is believed to be the Russian Government.

—On and after April 1st all agricultural implements imported into Queensland, Australia, will be exempt from duty, as well as machines and machinery, not including boilers and engines.



### Horseless Carriage.

A BROOKLYN genius has perfected the horseless carriage, in which all the objections to the old "freak" of that name have been overcome. It is as light as a victoria, noiseless as a bicycle, fast as an express train, and can be handled with ease, he claims.

The carriage looks exactly like any ordinary carriage, the electric storage-battery being completely hidden. By merely turning a handle-bar the carriage can be turned in any direction, and the speed regulated. The great fault of the old horseless carriage was the difficulty in turning, but in this instance this has been successfully overcome.

Most horseless carriages are run by petroleum or gasoline. These motive powers gave the passengers the feeling of being on an engine, and when not noisy there is invariably more or less of a disagreeable odor. But in the Brooklyn invention electric power will do away with at least the odors.

Then, again, a higher rate of speed is attained—the limit being thirty-five miles an hour. There is little danger of running out of electricity, for by simply attaching a drop wire to a neighboring telegraph or telephone line the storage-battery can be recharged; it would be difficult to prove that any electricity had been borrowed. Another method of supplying the storage-battery is by an ingenious contrivance which restores electricity to the battery from the motors whenever the carriage is going down hill.

An invention in itself is the combination lock on the motor lever. It is an ordinary lock, so far as working it goes, but when locked it is impossible to move the carriage by electricity.

### American Horses in England.

THE large importations of horses from Canada and the United States, a trade which is steadily increasing, has had the effect of considerably reducing the price of the ordinary kind of van, bus, and cab horse used in the streets of London. There is a reduction in their value of about £10 a head. Horses that, two or three years ago, fetched £25 or £30 can now be readily bought for £15 or £20 respectively. Common and inferior horses of all breeds and classes are cheap and almost unsalable at any but very low prices—undoubtedly the result of the large importations from America. First-class horses, however, of all kinds continue to fetch good money, and are scarce in the market. Those who breed the best get repaid for their trouble and skill, while breeders of indifferent horses can dispose of their animals only at a loss.—*London Live Stock Journal*.

### American Lumber in Shanghai.

AN important article of import at Shanghai is American lumber according to a report from Consul-General Jernigan at that port, just received by the State Department. This has principally consisted of pine from Oregon and Washington, though considerable redwood from California also finds an appreciative market there. The eastern part of China is almost denuded of trees, causing its native lumber supply to be very limited. Between 20,000,000 and 30,000,000 square feet of lumber were imported at Shanghai in 1896, of which 14,000,000 came from the United States, against about 9,000,000 for 1895. The mills for which most of this is needed are now complete, but more will be needed for railroads and houses, and Americans are advised to make an effort to secure the market.

### Making Bricks from Sand.

THE process of making bricks from sand, brought forward by Prof. E. C. Brice of Washington, is now said to have led to the formation of a company in California—location, &c., not given—with a view to carrying on the manufacture of such bricks on an extensive scale, no other ingredients entering into their composition than such as are contained in sand or earth. This stone brick, as it is described or termed, is produced from powdered stone—that is, sand, clay, etc., these latter being mixed with a prepared flux, which acts as a bond, holding together the particles of sand or other material used as a filler, the whole being thoroughly annealed by heating. Among the various merits claimed for this kind of brick, the saving of time is conspicuous, only ten hours being required for their manufacture, instead of eight to thirty days—a much reduced consumption of fuel—scarcely any loss from burning—a crushing strength of from 10,000 to 45,000 pounds to the square inch, instead of 40 to 4,000 pounds, and but three-fifths the cost of ordinary bricks.

—One concern placed orders last month for upward of \$35,000 worth of agricultural implements for the Russian market; while another had a shipment to Moscow of reapers alone valued at \$20,000.

—"During next month," said a leading manufacturer's representative for an agricultural implement concern, "I shall have between ten and twelve carloads of implements for Russia, Europe and the Argentine Republic."

—In the past sixty years the forests of America have produced the enormous quantity of 824,000,000,000 feet, and the value estimated at more than \$25,000,000,000. It is a curious reflection that the forests, once regarded as an impediment to the country's settlement and growth, to be felled and burned as rapidly as possible, should so soon become one of its chief sources of wealth, to be considered and protected by every means known to modern science and law.

### Competition with British Manufacturers.

THE phrase "made in Germany" has been the theme of many warning articles in British trade and technical papers, and of countless communications by British consular officials in all parts of the world, says Bradstreet's. The rapid advance of Germany as an industrial and manufacturing nation has undoubtedly been responsible for much of this, and the British manufacturer cannot complain of not being warned of the inroads on his trade by German competition. Enough has certainly been written on the subject to attract the attention of others than those immediately concerned, as the regulations as to stamping the country of origin upon goods originally adopted in the United Kingdom against German goods have been faithfully followed by other countries, the United States among the number. It is certainly interesting to find that some British papers have begun to examine into the matter of increasing German competition more narrowly, and that the generally pessimistic views of the British press regarding German competition are not entirely coincided in. A good example of this more discriminating view of the situation is furnished by an editorial article in a recent issue of the *London Financial Daily News*, which compares the relative trade returns, both import and export, of Great Britain and Germany, with the result that the British position is declared to be a satisfactory one, and that Great Britain is receiving its full share of the increasing world's trade. The total value of German merchandise imports in the calendar year 1896 is given at £216,198,800 and that of Great Britain at £441,807,335, while the exports for Germany were valued at £170,189,800 and those for Great Britain at £239,922,209. These figures indicate that while the German import trade increased 4.8 per cent. in 1896 over 1895, British trade increased 6 per cent. Export trade, on the other hand, increased 2½ per cent. from Germany and 6¼ per cent. from Great Britain. The total foreign trade of Germany increased 3.7 per cent. in 1896, while that of Great Britain increased 6.1 per cent. English imports were more than twice as large as, and English exports 41 per cent. in excess of, those of Germany, while the total British foreign trade was 75 per cent. in excess of the aggregate foreign trade of the German empire. Commenting on these figures the paper named says: "This statement proves in any case that our real and comparative progress is much more important than the expansion in German foreign trade last year, although the Teutonic efforts in some branches of business, where cheapness, even if combined with inferior quality, forms the great attraction, have been, undoubtedly, successful. In our opinion the reason is, in a lesser degree, due to cheaper wages and longer hours than to the very low percentage of profit German manufacturers seem to be satisfied with."

The tone of the above is calculated to give the impression that the British manufacturer need not fear German competition, except in cases where the quality of the goods must be sacrificed to secure business. It should not be forgotten, however, that the German manufacturer in the past has shown a praiseworthy desire to accommodate himself to the wishes of the consumer, and much of the progress which has been admittedly made by German goods has been owing to German willingness to study the consumer's wishes, and even his prejudices, to secure his trade. Another point to be made in this connection, is that most of the excess of British trade appears in imports. British export trade exceeds Germany's only 41 per cent., while British imports exceed German imports by 104 per cent. The Germans, while selling only 41 per cent. less, apparently refuse, or are unable, to buy nearly as much, proportionately, as the British. It may be, however, that British manufacturers have really not as much to fear from Germany as from some other nations. It is questionable whether, if the export movement of American pig iron, American steel rails, and other American products abroad continues in anything like the present volume, American competition will not draw off British attention from continental rivals, and the phrase "made in America" supplant "made in Germany" in the eyes of British manufacturers.—*Farm Machinery*.

### A Substitute for Rubber.

THE discovery of a substitute for rubber, which, it is said, can be produced in large quantities at less than one-quarter the cost of genuine rubber, is announced by a Sanoma County journal.

The substance is the product of a tree which grows abundantly in the central part of the State, and was discovered by accident. The tree is tapped near the base, and the sap, which is quite dark colored, is caught in a vessel. After being exposed for a day or two a layer of tough, elastic material closely resembling rubber is formed. If this is taken off another layer will form. This substance will vulcanize like rubber, and when properly treated is a perfect substitute for the genuine article. It is said by several scientific men that it will take the place of rubber for almost any purpose.

—The steamer Scaw Fell, which lately sailed from Brunswick, Ga., took a cargo of 2,750 tons of phosphate for Hamburg. From Fernandina, Fla., it is reported that 8,700 tons of phosphate are being loaded for different European ports.

—There are over 100 buggies and wagons now in use in Samoa, where only three years back not one was to be seen. With hardly an exception they are of American manufacture. It is high time that the colonial carriage builders should endeavor to supply the Samoan market.—*British Consul at Samoa*.

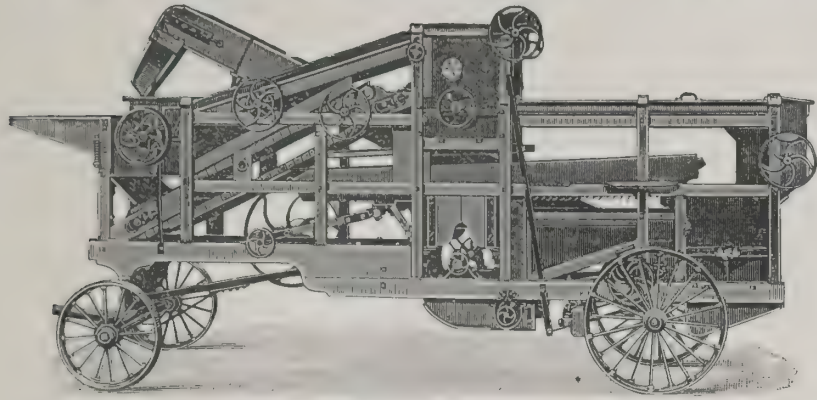
—According to advices received from Colombia by last mail, there will be a demand in certain districts for small steam plants for various industries. Prices and particulars have been asked of exporters for steam brick-making machinery, chocolate making apparatus and coffee hullers and dryers.



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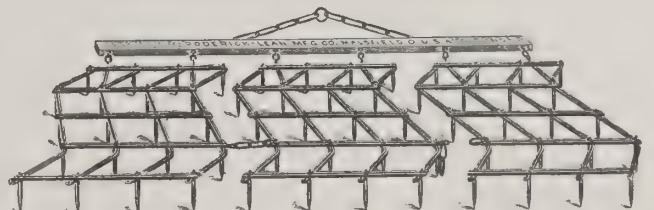
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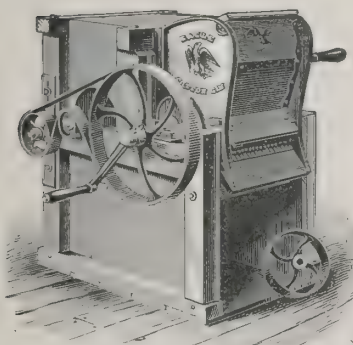
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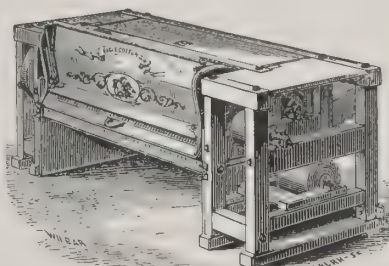
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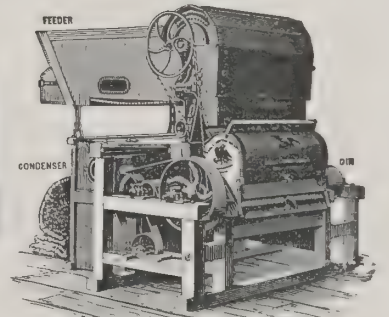


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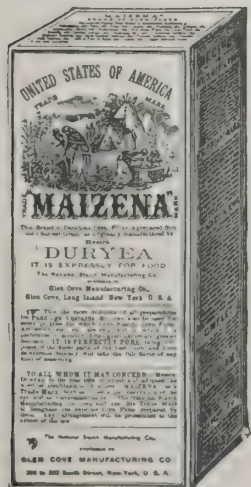
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# ELECTRICAL NEWS.

## Electrical Influence on Steam Engine Design.

FOR more than half a century the steam engine has served the innumerable wants of man. The work it was called to perform was of such variety, and the conditions in each case were so different that, of necessity, a great many types of engines resulted. In the vast majority of cases the problem put before the engineer was not, as it should have been, the broad one of converting the greatest possible amount of heat energy into mechanical power, but it was rather the specific problem of obtaining the mechanical power in such form as to be best suitable for general use. As the reciprocating motion of the piston was not convenient for practical purposes, except in very few instances, the piston was connected to a crank, and thus rotating motion was obtained, which was more suitable and preferable, though it involved numerous disadvantages incident to the crude and wasteful means employed. But until quite recently there was at the disposal of the engineer, for the transformation and transmission of the motion of the piston, no better means than rigid mechanical connections.

The past few years have brought forcibly to the attention of the builder the electric motor, with its ideal features. Here was a mode of transmitting mechanical motion, simpler by far, and also much more economical. Had this mode been perfected earlier there can be no doubt that the majority of the many different types of engines would not exist, for just as soon as an engine was coupled with an electric generator a type was produced capable of almost universal use. From this moment on there was no necessity to endeavor to perfect engines of special designs capable of doing special kinds of work. The engineer's task became now to concentrate all his efforts upon one type, to perfect one kind of engine—the best, the universal, the engine of the immediate future, namely, the one which is best suitable for the generation of electricity.

The first efforts in this direction gave a strong impetus to the development of the reciprocating high-speed engine, and also to the steam turbine.

The gas or explosive engine has been likewise profoundly affected by the commercial introduction of electric light and power, particularly in quite recent years. The engineer is turning his energies more and more in this direction, being attracted by the prospect of obtaining a higher thermo-dynamic efficiency. Much larger engines are now being built, the construction is constantly improved, and a novel type of engine, best suitable for the generation of electricity, is being rapidly evolved.—*Nicola Tesla, in Cassier's Magazine.*

## Independent Driving of Machines by Electric Motors.

THE advantages of independent driving of machines in any shop—that is, without the use of the traditional long lines of shafting—are never so well appreciated as when figures are available designed to show how much power is ordinarily used up in simply turning the shafting—in the friction of the transmission between driving and working points, says *Cassier's Magazine*. A good many experiments have been made in the past to determine what this waste amounts to and the results nearly always have indicated tremendous losses, relatively speaking. Still, one is not quite prepared for the figures given in a paper on the subject recently presented before the American Society of Mechanical Engineers by Prof. C. H. Benjamin. The trials of which they are the outcome were made at sixteen different establishments, with horse-power totals ranging from 8 to 400, and with percentages lost in friction from  $14\frac{1}{2}$  to 80, the average friction loss amounting to over 55 per cent. These figures, it is proper to add, include, in every case, the friction of the engine itself, but even if a liberal deduction be made for this we have still a formidable reminder. What a fruitful field there is here for the electrical engineer! While small steam engines are used in some cases for driving single machines, and form a part of them, it is to the electric motor that we will eventually be indebted for a wider application of the independent driving system. There are a few shops—models in their way—where this system is in use, and has been for several years, and year by year fresh proofs are given of its manifold advantages. In these shops machine tools of all kinds, travelling cranes, elevators, each has its own motor, big or little, and the line shaft, the countershaft and the multitude of pulleys are, indeed, relics of a past régime.

## An Electric Sewing Machine.

A CHICAGOAN, John S. Biggar, has patented an electrically operated sewing machine. It is very simple in its construction, and is adapted to be driven by a battery current. The needle is mounted upon the lower end of a core which is reciprocated by a pair of solenoids. A motor is contained within the frame of the machine and rotates the shuttle shaft. The solenoids and motor are placed in a common circuit controlled by a switch mounted on the frame of the machine. By this construction all the working parts are inclosed, thus eliminating all danger from handling by the uninitiated.

La Capital Company, of Buenos Ayres, Argentine Republic, South America, have let contract for the materials for a power station and the necessary equipment for the power in the station and the road bed and cars to parties in the United States. The Berlin Iron Bridge Company, of East Berlin, Conn., have the contract for furnishing the skeleton steel works of the building and the roofs.

## Wonderful Development in Electric Roads.

THE development of electricity in the distribution of its power has made great progress the last two years, when all other branches of industry have been standing still. Two years ago an electrical engineer estimated that there were then 850 electrical roads in the United States, operating over 9,000 miles of track and 23,000 cars, representing an investment of capital—including water, we suppose—of over \$400,000,000. The other day Prof. Bell, of Massachusetts, a professional authority, placed the present electrical railway mileage at 13,000 miles of track equipped with not less than 30,000 motor cars. The railway motors at present in use aggregate fully 1,000,000-horse power, and the generating plants close to 500,000. Last year's contribution to electric railway construction was 1,900 miles of track and nearly 5,000 motor cars. It is stated that this increase means an aggregate investment of something like \$35,000,000, a very respectable sum to be added to a single industry expansion. Including the stationary electric motors, operated by scattered or central stations and power transmission plants, with the electric railways, Prof. Bell thinks it is safe to say that the gross power of the electric motors used in the United States is at present not less than 1,250,000-horse power. Comparing such a list with the small group of power plants that were running five years ago, the strength of the business that has scored such gains in hard times is self-evident.

## Electric Haulage in Mining.

THE Woodward Mine of the Delaware, Lackawanna and Western Railroad at Kingston, Pa., is about to be equipped with electric haulage. The generating plant will consist of one 165 K. W. dynamo directly connected to an American ball engine. The circuits will be three in number. The first will pass down a vertical shaft 725 feet deep and will operate one ten-ton locomotive in the Cooper vein. The two others will be carried down another vertical shaft 1026 feet deep to operate two ten-ton locomotives in the Red Ash and Baltimore veins. These locomotives will be equipped with two 40 h. p. G. E. motors and will handle trips of loaded mine cars, each loaded car weighing about four and one-half tons.

It is estimated that this installation will show in operation a net saving of 29.5 per cent. over mule haulage, including a large reserve for depreciation, interest and fixed charges. The total output of these three locomotives will be about 3,800 tons per day, and the total length of trolley wire in the gangway will shortly reach four and a half miles. The equipment will be furnished and installed by the General Electric Company.

## Harvesting Ice Under the Electric Light.

KINGAN & CO., Ltd., the pork and beef packers of Indianapolis, Ind., write us: "As you well know, the harvesting of ice is something that must be done in a very limited space of time, and it becomes necessary for us to work night and day. For this reason we have resorted during the past Winter to the use of electric lights. We had intended sending out a dynamo from our packing house and running it directly from our power engines operating our elevator. But, finding that the neighboring park at Broad Ripple had a plant which was not in use at this time of year, we started it up for them. We ran wires to the ice houses along our runs and elevators and also out on the ice, using arc lights. This has been done by so many people that we cannot claim any novelty for it, but we can cordially recommend the use of electricity for this work, as it enabled us to cut and store ice almost as well by night as we did during the day. The lights or wires in the ice houses are permanent; we simply disconnect the lamps and carry them from one house to another as each fills up. With regard to work out on the ice fields, we string our wires on a movable frame, which is pushed around as our cutting advances from point to point."—*Electrical Review.*

## Electric Traction for Lima, Peru.

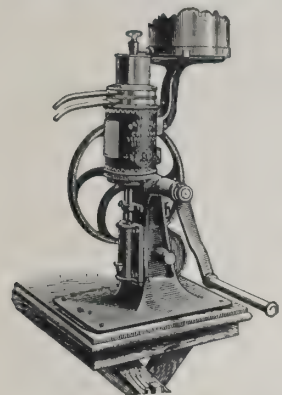
J. MITCHELL DE LAS CARRERAS, of Lima, who has been in this city some time for the purpose of transferring the Lima Tramway Company to an American company, entitled the South America Light, Power and Traction Company, has effected his plans and will soon return to Peru. The above company is now controlled by Messrs. Hearst & Stump, of New York City; ex-Senator Paddock, of Nebraska, and A. Murphy, of Omaha. The new company proposes to change all the horse-car lines in the city of Lima to electric roads. Negotiations are already being effected with different electric companies for estimates, etc. Mr. Carreras says that some very advantageous concessions which the government of Lima made with the old Tramway Company have been transferred to the new company, among them the privilege of importing all the materials for the roads free of duty. The government, this gentleman also says, is inclined to give the new company the concession for the electric-light plant to be built in the city of Lima.

—The Yerkes telescope, belonging to the University of Chicago, has been established at Lake Geneva, Wis., and is the largest in the world.

—Probably the largest X-ray coil is the one recently completed for the Western University, under direction of Professor Fessenden. It is wound with 50 miles of small wire, and is arranged to give a spark over 20 inches long, while the capacity of the machine reaches 30 inches. The current is received from two portable storage batteries.



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Immediate and absolutely complete separation of cream from milk by machinery.

100,000 machines in use in every country in the world.

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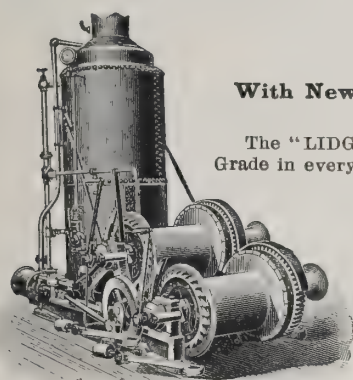
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**THE DE LAVAL SEPARATOR CO.**

General Offices, 74 Cortlandt Street. New York.

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# Dietz Tubular Square Lamp

Is most desirable for sheds and porches, also for barns, stables, outbuildings, etc., where "no smoking" is desired. This is an extra fine Lamp, made in three sizes, has no chimney, and no complication to make trouble of any sort. It has an improved burner and outside wick regulator; gives a very brilliant light that the strongest wind cannot quench—and, in general, it gives universal satisfaction. The list prices of the three sizes of this lamp are \$5.50, \$6.50 and \$8.50, and the export discount 40, 10 & 5 per cent.



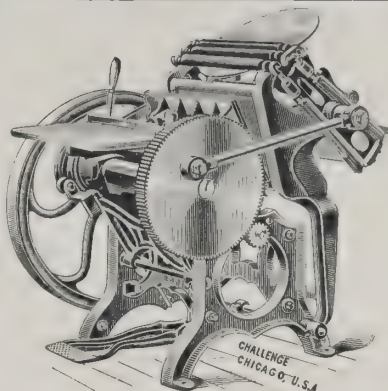
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NET PRICES F. O. B. CARS NEW YORK.

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A TRADE BRINGER.

# THE DE LONG HOOK AND EYE.

WHY?

Well, when women use it once, they use it again.

Absolutely it will not unhook unless you unhook it yourself.

It's genuine if on the face and back of every card of the famous De Long Hooks and Eyes you find the words:

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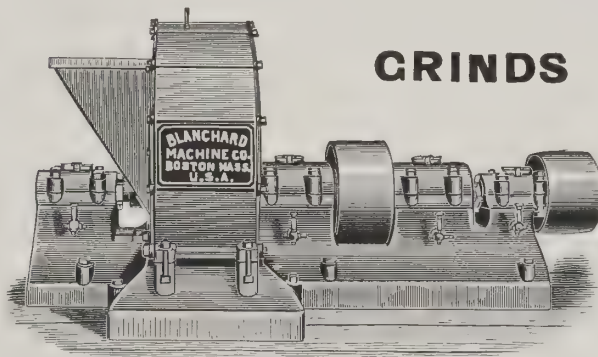
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Philadelphia, Pa., U. S. A.

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**GRINDS**

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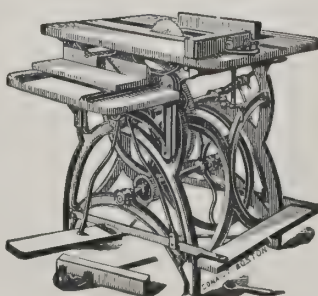
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FOR RIPPING, CUTTING OFF, GROOVING, RABBETING, CUTTING TENONS, MITERING OR BORING.



Weighs 300 pounds. Gauges slide in planed iron grooves in top. Gears are all machine cut. Shaft and arbor are made of steel.

Price, - \$60.00.

With boring table and side treadle, \$67.00.

**JOHN M. MARSTON & CO., Boston, Mass., U. S. A.**



# Anything Supremely Good

of its kind is

## Bound to Go.

(This is a Safe Prediction.)



# "MONARCH" ....AND.... "DEFIANCE"

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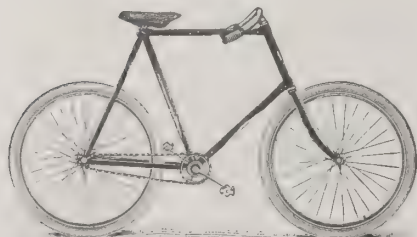
### MONARCH CYCLE MFG. CO.

Lake, Halsted & Fulton Sts., Chicago, Ill., U. S. A.

MENTION THIS PAPER WHEN WRITING.

### THE BLACK MFG. CO., - ERIE, PA., U. S. A.

We build bicycles of the finest quality only and have nothing to offer either in cheap or medium grade wheels. Our discount for export is 30 per cent., and we deliver machines properly boxed f. o. b. New York. Order through your commission house and send copy of order direct to us.



**TRIBUNE MODEL 27.**  
Price \$100. Weight 23½ lbs.

This is our standard men's wheel and is suitable for all kinds of road use. It is built in three heights of frames, 22½, 24 or 26½. The wheels are 28 inches diameter; 26 inches will be furnished if preferred. Gear, 68; options, 60, 63, 72, 73 or 80; cranks, 6½ inches, 7 inches if preferred. If not otherwise specified, all machines will be fitted with Hartford or Morgan & Wright tires. All wheels are supplied with tool bag, tools and repair kit. Regular finish, black enamel, nickel trimmings. If a lighter wheel than the above is desired, order should specify Model 21, which will weigh with light road equipment about 20½ lbs.

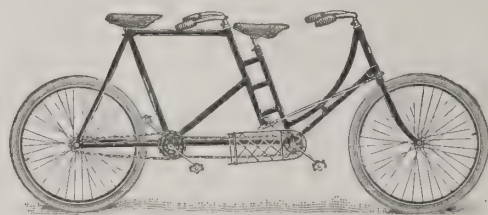
## Tribune Bicycles.



**TRIBUNE MODEL 24. Price \$100.**

Our ladies' wheels are built in three heights of frames, 20½, 22½ or 24 inches. 20½ inches is standard and will be shipped if not otherwise specified. Wheels, 28 inches, can be furnished, with 26 if preferred. Regular gear, 63; options, 56, 60, 68 or 72; cranks, 6 inches throw. The weight is about 24 lbs.

The Celebrated  
Cycloidal  
Sprocket.  Used on  
Tribune  
Bicycles only.



**TRIBUNE MODEL 23.**  
Price \$150. Weight 44 lbs.

Our tandems are also built with double diamond frame for use of men riders. Wheels are 28 inches; height of frame, 24 inches; ladies' forward frame, 20½ inches. Gear, 68; can fit with 72, 76 or 80, if desired.



### GOOD AGENTS WANTED

TO REPRESENT

## The Standard Wheel OF AMERICA.

Write for Terms.

Write for Catalogue.



### STANDARD BICYCLE MFG. CO., 71 Jackson Blvd., Chicago, Ill., U. S. A.





### Cheap Wheels.

THE business of cheap bicycles has developed to a wonderful extent. There are now three recognized classes, one selling for \$100; medium, \$50 to \$75, and low-grade or cheap wheels listed at \$50 or less. Cheap wheels at wholesale generally sell for spot cash, and hence the business has been wonderfully developed. The demand for this class of wheels is large and growing. In the recent New York Cycle Exhibit wheels were sold in lots for \$21, equipped with saddles and good tires. Wheels were sold at wholesale at a price which allowed a good profit to the retailer who could sell at \$30. A frame, with seat post, forks, sprocket, cranks, sprocket cups and cones, was publicly quoted at \$14.50 to the trade, and bicycles were offered complete in thousand lots at \$22.50, or for \$16.50 without tires and saddles.

Some of these cheap wheels are sold with tires and saddles, and some without. Some wheels without have sold at \$15, but are generally made of odd parts. Discarded parts bought up in factories are the basis of these cheap wheels. Brazed instead of drawn tubing is used. Savings are made in cast-steel cranks, malleable iron sprockets, cheap or slightly imperfect wood rims, chain of inferior quality, which is at times offered as low as 9 cents per foot; an inferior quality of stampings, used whenever possible; hubs made of a tube with brazed flanges; frame sand blasted, instead of being filed up, and then dipped in enamel. It is the custom to generally supply the best tires, but saving in this regard is sometimes made by inserting an inner tube in an imperfect hose-pipe tire. Many of these wheels are guaranteed for a year.—*Carriage Monthly*.

### What They Dislike Abroad.

FOREIGNERS never concede that the competition of American goods is a serious factor in any line so long as their introduction is controlled by improperly qualified native importers who are willing enough to fill an order and equally unwilling to do the work of initiating trade and creating a demand for them. But as soon as the American producer places his commodity in a foreign market in his own right, by means of representatives thoroughly qualified to represent and as thoroughly identified with his interests, as the cycle manufacturer has very wisely done, the whole aspect of the case changes.

The successful introduction of American bicycles by this means in many foreign markets is well known, and the advantages of a foreign trade to the American manufacturer have been vividly illustrated during recent domestic depression and industrial uncertainty. That which has been done by the cycle makers in this direction will exert a powerful influence on the future of American export trade. American cycle manufacturers having created facilities that outrun domestic demand, great as that is, are still seeking new outlets in Europe and are doing it in their own name, thus holding at their command all the forces that make for the building up of a demand for their machines. This is rapidly making the American bicycle a factor in calculations for trade in their home market by foreign makers, very much to the disgust of the foreign makers aforesaid.—*The Wheel*.

### Sunshine as a Tire Injury.

IT may not be known even to every one in the tire trade that solar heat is sufficient to vulcanize rubber, provided too great a proportion of sulphur is not used. Excessive exposure of a wheel to the sun's rays has the immediate effect of overvulcanizing the tires thereon, which overvulcanization hastens deterioration, often thus being directly responsible for the unsatisfactory wearing qualities of a tire which may in every way have been a product of most excellent material and workmanship.

—The latest novelty in the bicycle line consists in gearing the steering bar to the seat post, which is turned from side to side by the motion of the body, both the hands and feet being used to propel the wheel.

### What Pressure in Tires?

AS the superiority of the pneumatic tire lies in the fact that it is more easily compressed and returns to its natural shape quicker than the solid, and also to the fact that it flattens out under the weight, and covers a greater amount of surface, it naturally follows that the elasticity of the material of which the tire is made, and also the pressure of the air within, will have a considerable effect upon the ease with which it will run. As to the air tube itself, it may be said that the thinner it is, consistent with strength and durability, and the more elastic the material, the better it will be. A hard, thick tube will absorb so much power in bending in and out as largely, if not wholly, to offset the gain due to the greater flexibility afforded by the mobility of the compressed air within.

As to the air pressure, it will be found that on rough stone pavements or soft dirt roads a reduction of pressure will make the wheel run easier, but on hard, smooth roads it will not produce a very noticeable difference. So far as the air pressure alone is concerned, it might be said that the lower, the better, because one of the reasons why a pneumatic tire runs with so little exertion is that it flattens out and covers more ground, and thus prevents the wheel from dropping into every small depression.

But as the bending in and out of the tire absorbs power, it is evident that if the pressure is reduced too much, the loss occasioned by the extra flattening of the tire will be greater than the gain due to the increased surface in contact with the road. From this it follows that both extremes of pressure will give the poorest results, and that the best will be obtained at some middle point. Where this point is can only be determined by actual trial, as it will differ with different makes of tires and with different weights of riders. On general principles, it may be said that for soft roads, a soft tire will give the best results.—*The Wheel*.

### American Cycles.

LAMENTING editorially the effective invasion of the British markets by American cycles, the poor old *Cyclist*, which has so long sought to belittle and deny the hold American made wheels had upon the English market, now comes forward with the bold Briton's last resort and asks that a sufficiently large duty be put upon American wheels to keep them from gaining further hold upon British markets. What a confession this is for the *Cyclist* to make, after all it has said about the unsatisfactory qualities of American-made machines and the utter impossibility of such machines to secure a market in Great Britain!—*The Wheel*.

### Novel Bicyclists' Tool Bag.

A GOOD deal of time has often been wasted just when it could be ill spared, from the necessity of dumping the whole contents of a tool bag out before the wrench, pump, or other article specially required could be found. A novel tool bag has been invented, which should save the cyclist's time and temper, too. It is shaped like a cylinder, and occupies about the same space as the ordinary contrivance. The tools are divided by partitions on the inside on a revolving frame. Each revolution exposes the contents. Separate the wrench, the pump, and the rest of the equipment. Each compartment adapts itself to the size and shape of the tool which fits snugly and does away with rattling.

—A New York export house will shortly ship \$18,000 worth of bicycle parts and materials, most of which will go to Mexico, where certain goods of American manufacture are demanded, and for which it is impossible to substitute those of any other country. It augurs well for the future of our trade with Mexico that the people of that country prefer our manufactured products to those of European countries which have long had a strong hold upon the markets of our southern neighbor. There is every indication of increased trade between the United States and Mexico.



### Saves Leg Work.

COMMERCIAL Agent Joe Whatmore, of the Chicago Great Western Railway, completed 125 miles on the streets on his bicycle, with a coaster and brake attached, which is being daily demonstrated by Mr. Whatmore, a very practical and safety device, particularly as to the brake. The coaster consists of an invisible ball-bearing interior of the small rear sprocket, which locks and unlocks by foot or pedal pressure at the will of the rider. Its mechanism is simplicity itself and the pedal exercise is reduced about two thirds, as any one observing Joe riding will notice. He averages only about 5 pedal revolutions to the block, or 100 to the mile instead of 300, which is the rule. The brake is equally as simple and very reliable, enabling the rider in an emergency to bring his wheel to a full stop within 10 feet if so desired, both devices being always under control of the feet and ready at all times for immediate action. Both are the invention of Lieutenant Phillips, of the United States Army Bicycle Corps stationed last Summer at Fort Leavenworth, Kan.

### Won on an American Wheel.

THE idea that light American wheels are unfit for rough road work has been dispelled in Australia, to a great extent, by J. E. Snell's record-breaking ride from Adelaide to Melbourne, 578 miles. The roads in places were in a terrible condition, yet he cut the record by seven hours, reaching the post office in Melbourne, where several thousand people had congregated, in the official time of two days, thirteen hours, three minutes and thirty seconds. He rode a 24-pound wheel, and although he was thrown several times he was not called upon to use even a wrench.

### Minor Coinage of the United States.

IT is among the possibilities of the future that the minor coins of the United States Government will be cast in nickel and alloy. Recent experiments with aluminum and various alloys, having proved successful, the attention of the House Committee on Coinage has been turned toward finding some substitute which would answer the purpose, as it has been decided that it would be unwise to continue the use of copper as at present. It is not the intention to use pure nickel, of course, for the coins. The United States 5-cent piece of to day really contains only 25 per cent. of nickel, the balance being of copper. This seems difficult of belief on account of the bright appearance of the coin, but the fact is due to the nickel giving more than any other metal its own color to an alloy. Only one country in the world uses nickel for coinage without combining it with any other metal—Switzerland. It is found in the coining of the metal there, that the operation is very slow and expensive. This, therefore, puts an end, according to belief of the Coinage Committee, to the project of coining any United States money out of the metal without alloy. The mint experiments include combinations of nickel, copper and zinc, forming the alloys known under the head of German silver; copper and tin, which produce bronze; aluminum and copper, which make aluminium bronze. German silver has been used for coins by one of the small South American states and proved fairly well adapted to the purpose.

### New Cement Compound.

A NEW kind of cement compound has been devised by Prof. W. L. Woods, a Washington chemist, and which, he states, is capable of satisfactory use for various purposes of house construction and decoration. As described, it is a metalloid in its nature, the bases of it being magnesite and rock crystal, these, with other elements, being finely powdered and placed in a crucible, subjected to a heat of about 60 degrees, and the substances which are used to produce the various effects are added in the crucible. The liquid resulting, which is about the consistency of molasses, on being poured into moulds, cools almost instantly, and expanding, fills every portion of the pattern completely, the natural color of the substance when cool being like that of soapstone. The plastic and its concretes will withstand all natural thermal changes, and may be used in any place and for any purpose where it is not subjected to combusive heat. It is exceedingly hard, but yields to the file and other steel instruments, is waterproof, and resists all acids to the degree in which they are used in the arts, and, withstanding as it does all the ravages of the elements, is practically imperishable. The specific gravity of the material can be varied in degree—hard or soft—by the filler used.

—Few people have an idea of the extent to which the use of pneumatic tires has gone. They are no longer confined to bicycles. They are put on a great variety of the lighter carriages. It is predicted that they will eventually be put on the heaviest vehicle. Already they are manufactured for vehicles weighing from 1,000 to 2,000 pounds.

—The shipments of bicycles and parts to England, Germany and France, a few weeks ago, according to a freight broker who attends to the direct shipment for four of the leading wheel manufacturers in the country, were valued at upwards of \$65,000.

—Noiseless bicycle chains are made by covering the links with rawhide, which is fastened to each link by wrapping around it and lapping the ends under a small bolt to hold them fast.

### American Patents in Foreign Countries.

BALTIMORE, Md., March 29, 1897.

To the Editor of THE AMERICAN EXPORTER:

DEAR SIR.—The position you have taken in several articles regarding patents and trademarks appears to me to be entirely correct. To my mind the protection afforded an inventor in the exclusive right to manufacture and sell devices of his own creation, and to a manufacturer or merchant in the exclusive right to use a trademark of his own design for the identification of his products or the goods he handles, is pregnant with industrial advantages similar to and coördinate with the advantages derivable from protecting the right of ownership in any kind of private property. That the protection afforded to inventors by the patent system of the United States has been one great cause of the marvellous development and unparalleled progress in mechanical arts realized in the country, no well informed person will question. It is equally clear that a foreign country which gives to American inventors the same protection accorded them in their own country will thus secure their coöperation in developing its mechanical arts, thereby sharing the advantages of American inventions equally with the United States. I am therefore not surprised to see Japan, the most progressive foreign nation of to day, acting upon your suggestion and according rights to the inventors of other countries. When I noticed the letter of R. Masujima, of Tokio, in your issue for November, 1896, announcing the probability of such action I felt sure of his ability to satisfy his countrymen of the good policy involved in the proposal, which opinion has been confirmed by a proclamation issued by the President of the United States, under date of March 9, 1897, announcing the conclusion of a convention between Japan and the United States whereby American inventors may secure patent rights in that country.

Judging from observations made while employed for several years as an examiner in the United States Patent Office and during subsequent practice in obtaining patents in the United States and foreign countries, it is my opinion that there are many American patents adaptable to the industrial condition of Japan which if properly reissued under the laws of that country will become the basis of important undertakings that will be profitable to those who engage in them, and a benefit to the country at large. Now that the right to obtain such patents has been granted by Japan an important movement in that direction may be expected.

Respectfully,

ARTHUR STEUART.

### The Modern Trade Journal.

I DO not hesitate to put forward the assertion that the "rank and file" of trade papers show more intellectual cleverness in their advertising columns than can be found anywhere else in the journalism of America.

There is not a single representative trade journal that in some way or other does not possess a redeeming trait in this respect, and a great many are as artistic, clear cut and scintillant as the business pages of any of the high-class literary magazines.

The trail of the amateur ad. writer has not yet ensnared itself through their columns, but the outcrop of the sturdy brain of the practical, up-to-date business man is there in all its forceful comprehensiveness, sight-compelling typography, great good humor of "the shop," and unmistakable acquaintance with the technique of the goods written about.

The best humor in American advertising to-day is in the trade journals.

The most forcible advertising language is in the trade journals.

The business announcements that are couched in the most gentlemanly, well-bred college-put English are to be found in the trade journals.

The greatest percentage of terseness and compressed intelligence is in the advertisements of the trade journals.

The best models of artistic typography and engraving art are to be found in the advertising columns of the trade journals.

The trade journal is a development not an experiment. It is the evolution of the circular, the booklet and catalogue into a full-grown end-of-the-century periodical, taking on increased vigor and enlarged facilities at every stage. Considered as a class, it is the embodiment of progressive ideas and the exponent of what is modern and new.—Edward A. Oldham, in *Advertising Experience*

THE Gorham Manufacturing Company, at its plant at Providence, R. I., has just cast in bronze one of the largest equestrian statues in the world, that of Gen. Antonio José de Sucre, a Venezuelan hero. The statue is to be erected by that country in a square at Caracas. From the plinth to the top of the head of the general's figure the perpendicular distance is 13 feet; from the plinth to the top of the steed's back, where the figure of the soldier is seated, the height is 7 feet 10 inches; 4 feet 11 inches measures the distance from the plinth to the underbody of the horse; from the tips of the animal's ears to the tip of the tail, lines drawn diagonally, measures 15 feet. The weight of the whole statue in bronze is 5,570 pounds.

—German lead pencil makers are using United States redwood for the wooden part of their products. Since straight grain is necessary in such stock, redwood should answer the purpose nicely.

—Among the American manufactures that are exported are barber chairs. We send barber chairs to Mexico and Central America, the West Indies and South America, and American barber chairs are sent also to the continent of Europe and to England. Barber chairs in limited numbers have been sent to Europe for a considerable time, but the demand for them from that quarter is increasing.







### The Stockholm Exhibition.

ARRANGEMENTS have been made for an excursion of American manufacturers and exporters to Denmark and Sweden, including the Stockholm Exhibition, to start from New York in May or June this year. The object of this excursion is for American manufacturers and exporters to investigate for themselves the facilities of opening trade with the northern part of Europe through the free port of Copenhagen. A stop of ten days will be made in Copenhagen, thence the excursion will proceed to the industrial exhibition in Stockholm, Sweden. Another stop of ten days will be made there, which will enable the participants to examine the industries of the Scandinavian countries, and thereby judge for themselves to what extent American products could be introduced in these countries.

The whole trip can be made in two months, and the ordinary expenses will not exceed \$210, including first cabin on steamer from New York to Copenhagen and return (Thingvalla Line), first-class railroad to Stockholm and back, ten days' stay at first-class hotel (rooms only), both in Copenhagen and Stockholm.

The excursion will be led in person by Mr. George Kirkegaard, 28 State street, New York, who will gladly supply further information and illustrated pamphlet relating to the free port of Copenhagen.

The northern countries of Europe import considerable quantities of electrical apparatus and are well worthy the attention of American manufacturers. Mr. Kirkegaard is personally known to us, and has already received a number of acceptances.

### About Mexico.

SOME interesting facts and figures respecting the Mexico of to-day are given in a recent issue of the quarterly bulletin of the American Geographical Society. The population reaches the 15,000,000 mark. There are 7,000 miles of railroad in operation. The exports of the precious metals in 1895-96 were valued at \$64,838,596; and the exports of commodities, \$40,178,306. Imports for the same period amounted to \$42,253,938, of which \$20,145,763 were from the United States. As a gold producer Mexico is destined to a leading place among nations. The total coinage of gold up to 1896 is estimated at \$125,375,685; and that of silver \$3,400,950,410. The forests of the country include 114 varieties of building and cabinet woods, also dye woods, oil-bearing trees, rubber, etc. A more general knowledge of the resources of our sister republic would do much to stimulate commercial relations between the two countries, to the positive advantage of both.—*Age of Steel.*

### New American Ambassador to Austria.

MR. CHARLEMAGNE TOWER is so well and favorably known that his appointment to an important mission needs no commendation. He is a cultivated gentleman widely known for his literary and scientific attainments, and though he has not heretofore had experience either in politics or diplomacy, his culture and native intelligence may be relied upon to make him a serviceable and acceptable Minister of the United States; one who will maintain the dignity, conserve the interests and advance the reputation of the United States.—*Public Ledger.*

### Improvement in Car Cleaning.

THE method of cleaning railroad cars by means of air has been adopted by most of the railroads of the country; but one difficulty has always been that the dust drawn or blown from the seats and window sills fills the air and again settles down and deposits itself through the car, and is difficult to get effectually rid of. A great improvement has been made by the adoption of a device which not only effectually takes up the dust, but delivers it out of the car window. It consists of an invented funnel, across the opening of which are fixed three or four wires that, as the device is moved over the cushion, open up the pile. The air jet is only  $\frac{3}{4}$  of an inch in diameter. This strikes a cone; this cone fills the  $2\frac{1}{2}$ -inch top of the funnel within  $\frac{1}{8}$  inch all around. As a vacuum creator this is a great success. When started on a row of seats that have been dusted in the ordinary way, the discharge from the cloth hose resembles a stream of liquid dirt. The discharge hose is about four feet long—just enough to reach out of a window when being used on a seat.

### American Made.

WHEN it is observed to what great extent the industrial and commercial activities of the world have taken direction from American inventions and ideas, no violent efforts of the imagination is required to see that the time is approaching when American business methods will be brought into requisition to place American products in the markets of the world under their rightful designation of "American Made."

—The Davis & Egan Machine Tool Company, of Cincinnati, O., have just received an order from Messrs. Deffries & Co., of Düsseldorf, Germany, for \$25,000 worth of machine tools. They have also received a large order amounting to \$10,000 from the Volga Steel Works, of St. Petersburg, Russia.

—No country has ever prospered which has not fostered its iron industry. Iron may be almost said to be the life-blood of nations. It forms the muscles of all industries. It is essential to the well-being of every civilized country. The State which imports its iron exists by permission of its rivals.—*Mr. Hobson in Canadian Manufacturer.*

### Notes of Interest.

—In the last year and a half the Baldwin Locomotive Works have shipped 350 locomotives to foreign countries.

—The steamer Capac, which sailed lately for Chilean and Peruvian ports, has on board 1,949 packages and cases of mining machinery, hardware and heavy tools for the port of Callao alone.

—Agents of the Brazilian Permanent Exhibition of North American Industries are shipping by every steamer to Rio de Janeiro quantities of equipments for the army, navy and fire department.

—Some satisfactory orders have recently been received from the Argentine Republic for printing machinery and types. A leading export house will shortly have a shipment for upwards of \$15,000 in this line for that market.

—The day is not far off, says the *Philadelphia Commercial List*, when the American ship will have just such precedence and preference all round the world as the American sewing machine, the American shoe, the American ham and the American bicycle, not to mention the best of all our products, the American girl.

—If one is a transatlantic traveller, one reads with some interest that an American shoe shop is announced for London. When footgear is to be replenished across the water, particularly in London, the American woman sighs for her New York bootmaker. The light, trim, easy boots she buys anywhere at home she cannot find in England.

—There is a market for American shoes in Brazil. An export firm recently sent out more than thirty samples of different styles and qualities for both ladies and gentlemen. The exporter reports that orders have been coming in quite satisfactorily, and that customers in the market claim that the usual run of prices is a shade under those of France and England.

—In office buildings in several American cities, compressed air is used to run clock mechanism in each office. The mechanism is controlled by a master clock which is kept correct by the most approved methods, and the dials distributed through the offices cannot vary more than 30 seconds, fast or slow, from it. The dials have only the mechanism necessary to move the hands.

—There are five points of successful business:

There must be something to sell.

There must be a place to sell it in.

There must be enough money to buy it with.

There must be somebody to sell it.

There must be something to tell somebody you have it.

—United States Minister Buchanan, at Buenos Ayres, has made an effort, with promise of a successful outcome, to induce the Argentine Government to publish advertisements calling for proposals for government supplies in the United States so that our manufacturers may have an opportunity to compete. At present these advertisements are published only in London and proposals are receivable only at the Argentine Legation there. The Argentine Government has encouraged the Minister to hope for its consent.

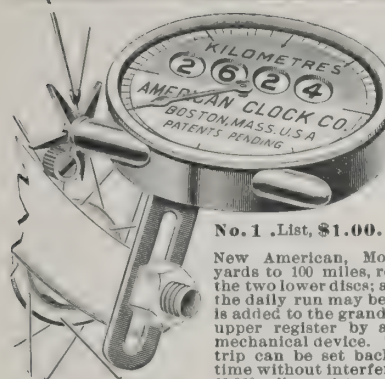
—The heavy shipments of machinery, rails and other railroad material and of the various furnishing equipment of different industries to Japan and other Eastern countries are encouraging indications of a rapid and heavy development of our foreign trade. Our opportunities for deployment in this direction are opening up like a Summer fan. What this means to American industry needs no telling. The duty of the manufacturer and exporter is to cultivate this special form of trade, for on its success or otherwise hangs our destiny as an industrial people.

—On June 26th an important engineering exhibition is to be opened in Sydney, New South Wales, to remain open during the months of July and August. It is intended to embrace engineering in all its branches, and the exhibits will consist of raw materials, manufactured articles, machinery and models, drawings and photographs of all kinds relating to scientific, mechanical and educational works in classified sections. The object of the exhibition is the advancement of engineering science and the promotion of a general and practical education therein.

—The manufacturers of Europe, and particularly those of Great Britain and Germany, are anticipating and preparing for a hard struggle with their American competitors. The notable increase of American exports of manufactured products during the last two or three years and their popularity abroad have warned foreign makers that their supremacy in the markets of the world is threatened and aroused them to the necessity of putting forth every effort to maintain their position. They can hold their own, however, so long as they have the advantage over our manufacturers of direct communication and transportation.

—The invasion of the home markets of Europe by the American-made bicycle has, as might be expected, developed local opposition. This has to be fairly and squarely met to secure a permanent standing in Continental Europe. It must not be forgotten that high-priced wheels are not so easily salable where the average wage and income is less than our own. The purchasing power is a vital question. However ripe and desirable a plum may be, if it is out of reach the man with a short pole can only look at what he cannot get. The American bicycle may be an acknowledged superior of the European article, but if high prices prohibit its purchase its merits are at a discount. To meet this with inferior workmanship or material would be a suicidal policy. Perhaps a little less appetite for large profits might remove one of the serious obstructions to a large and growing European trade in the American wheel.

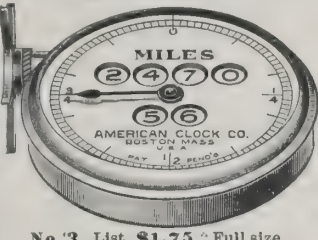




### The American Cyclometer.

Fully guaranteed. Claimed to be the most accurate and reliable made. Registers from yards to 10,000 miles and repeats. All made in Miles and Kilometers. Sizes, 24, 26, 28, 30 inch wheel. Easily read from the saddle. Requires no Care. Does not get out of order. Weight, 13-4 ozs.

NOTE. The Special Century Run Trip registers, as shown in cut of the



No. 3. List, \$1.75. Full size.

No. 1. List, \$1.00.

New American, Model 3, from yards to 100 miles, registering on the two lower discs; and whatever the daily run may be the amount is added to the grand total of the upper register by an ingenious mechanical device. The Century trip can be set back to 0 at any time without interfering with the 10,000 mile register. Electrotypes

on application. Write for discounts. AMERICAN CLOCK CO., BOSTON, MASS., U. S. A.

## SUPERB — OWEN BICYCLES — SUPERB



**SUPERIOR** Design. Workmanship. Material.

**WE NEVER COPY;  
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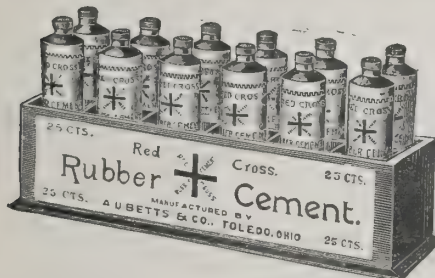
Easiest running and most perfect bearings in the world.

**THE OWEN OUT-COASTS THEM ALL.**

Write for Catalogue and Terms.

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## RED CROSS RUBBER CEMENT.



The BEST CEMENT in the world for Repairing Pneumatic Tires. For sale by all first-class dealers throughout the world. It has no equal. These tubes are put up in neat and attractive cases, containing one dozen tubes each. None genuine unless it bears our trademark—

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Send for catalogue of Red Cross Specialties. Sample Tube by mail, 25 cents. Ask your dealer for it and take no other. Manufactured by

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AGENTS WANTED.

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Most Complete Line in the World.

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Cost Prices:

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If you wish to import Bicycles THE BEST is what you want.

Shipments can be made to any foreign country in a prompt and satisfactory manner.

TEMPLE BICYCLES ARE GUARANTEED TWO YEARS.

Order a sample at export prices and you will wish the exclusive sale in your city. We have more agents in foreign countries than any other American house. Buy direct of us and save "commission house percentage." Send for Art Catalogue.

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## Secure Agency for Soudan, Nile and Pyramid Bicycles.

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**MONEY MAKERS.**

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Represented in more than 200 cities in the United States.

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FREE: Illustrated pamphlet with testimonials from leading concerns. Active, responsible DEALERS DESIRED in all open foreign cities.

**DENSMORE TYPEWRITER CO., 316 Broadway, New York, U. S. A.**

Every dealer who purchased

## Wheeler Reform Saddles

last season is ordering large quantities this season. Why? They are easy to sell and do not come back on the dealer's hands. Ladies like them. Physicians recommend them. All find them comfortable. No saddle soreness.

If your dealers cannot supply them, write

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In ordering through export commission houses, send us duplicate order.



**BUILT TO SIT ON,  
NOT TO STRADDLE.**

THIS CART is used for hauling lumber and various other material. One horse with forward truck will keep ten or a dozen rear trucks employed. The load is balanced on rear truck. When the two trucks are coupled together they make a complete lumber wagon.

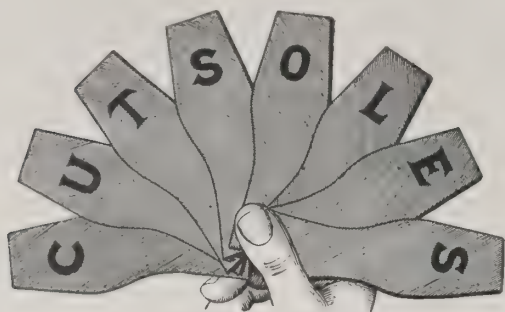


NO. 1 LUMBER CART.

This cut shows the two trucks coupled together, the same as an ordinary wagon. The reach has a hook at the end to hook into the draw staples of the rear truck.

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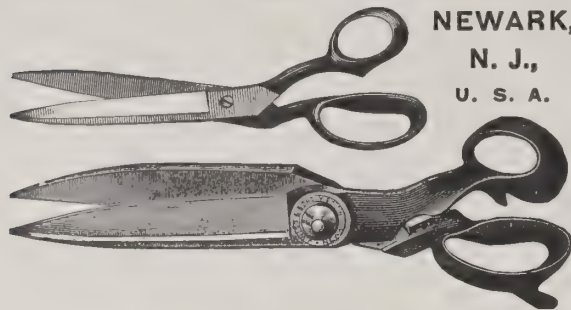
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### Women's Cut Soles and Leather.

Orders filled through commission houses.  
Correspondence solicited.

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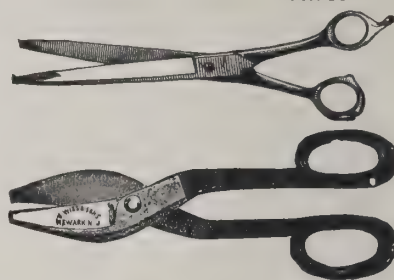
Manufacture the Largest Assortment of ONLY THE  
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STRAIGHT AND BENT TRIMMERS,  
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SNIPS, PRUNING SHEARS, LADIES' SCISSORS,  
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Send for Illustrated Catalogue "E," and when ordering through Commission  
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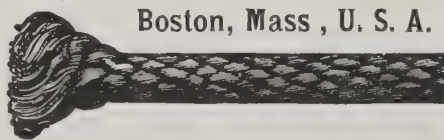
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RAILROAD BELL CORD, } ITALIAN HEMP.  
ARC LIGHT AND TROLLEY CORD.

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### Solid Braided Cordage.

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CLOTHES LINES,

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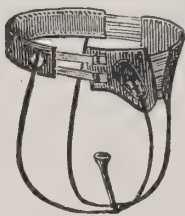
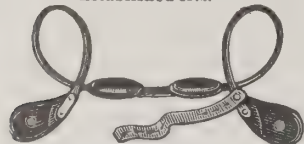
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Established 1872.

Successors to

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Manufacturers of all kinds of Indestructible  
Hard Rubber, Elastic and Leather-Covered

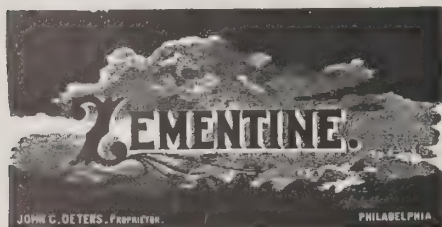
### TRUSSES,

Abdominal and Uterine Supporters, Shoulder Braces, Crutches,  
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For Home and Export Trade.

Sole Makers of the CELEBRATED DR. McINTOSH NATURAL  
UTERINE SUPPORTERS.

We solicit orders through export commission houses.  
Send for Catalogue and Price Lists.



### The New Waterproof MINERAL PAINT.

IT IS AS CHEAP AS WHITEWASH AND FAR SUPERIOR.

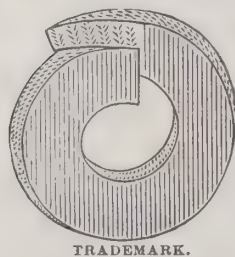
For Brick, Stone, Cement and other surfaces, particularly for Damp Walls inside and those outside exposed to the weather; for Factories, Breweries, Slaughter Houses, Tanneries, Stables, Etc., Etc. Especially adapted for Cellars in dwellings and buildings of every description. Orders filled through Commission Houses. Correspondence solicited. Catalogue "A" on application.

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Zementine is a white powder; 2 lbs. dissolved in one gallon water will cover 100 sq. ft.; price, 6c. per lb. in bls. of about 350 lbs.



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### COULD'S STEAM AND WATER PACKING.

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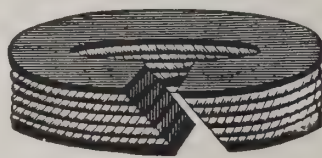
IN ORDERING, GIVE EXACT DIAMETER OF STUFFING BOX AND PISTON ROD OR VALVE STEM.  
SELF-LUBRICATING, STEAM AND WATER TIGHT.

Less friction than any other known Packing. Never grows hard if directions are followed. Does not corrode the rod. EVERY  
PACKING FULLY WARRANTED.

N. B.—This packing will be sent to any address, and if not satisfactory after a trial of 30 days, can be returned at our expense. None  
genuine without this trademark and date of patent stamped on wrapper. All similar packings are imitations and calculated to deceive.

THE COULD PACKING COMPANY, EAST CAMBRIDGE, MASS.

ORIGINAL RING PACKING



ALBION CRIPMAN, Treas.

### S. PORTER & CO.

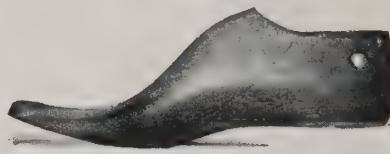
Manufacturers and Exporters of a

Full Line of Men's,  
Women's and Children's

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### JOHN BERTRAM & SONS,

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Fountain and Stylographic Pens, Gold Pens and Pearl Holders.

Holders made of best Para Rubber, Pens 14 carat fine. Export orders a specialty. All goods  
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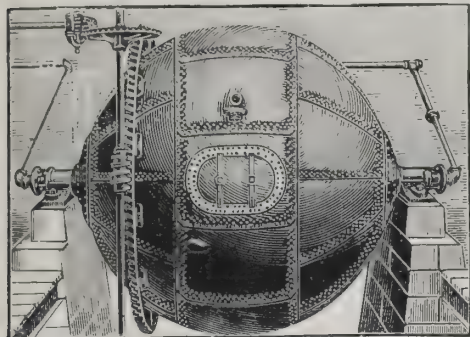
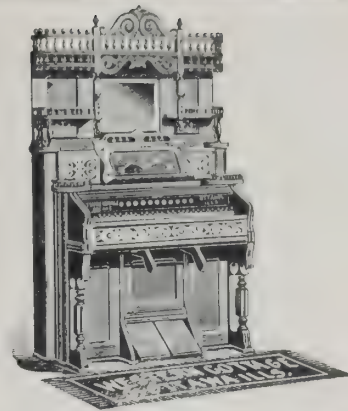
# THE BEST IS THE CHEAPEST.



Why do the Organs and "L. B. Merrifield Co." Pianos, which are made by the Western Cottage Piano & Organ Co., give such unparalleled satisfaction? Because they are made of the best material that can be produced and by the best mechanics that can be secured and under the personal supervision of some member of the company. The Merrifield Co. Piano is unsurpassed in tone, action, finish and durability.

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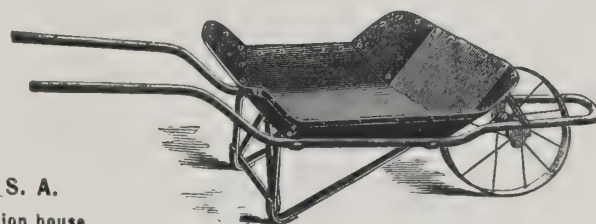
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The Rotary Globe Bleacher Boilers are used by paper mills whether rags, rope or straw is used, and no paper mill is complete without one.

We also make a full and complete line of steel wheel barrows. A complete catalogue of all goods manufactured sent on application.

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Send duplicate order to us when ordering through a commission house.



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FRANKFORT-ON-THE-MAIN, GERMANY.

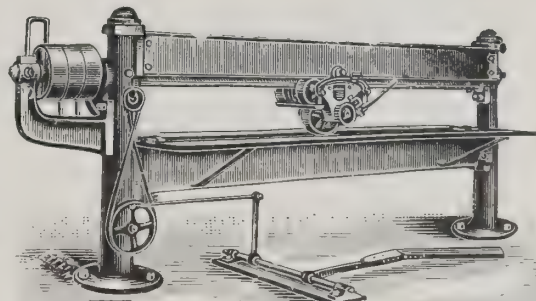
Established since 1862.

**SPECIALTY:** Machines and Complete Outfits for all Leather Trades, for Boot and Shoe Factories, Shoe Upper Manufacturers, Tanners, Curriers, Belt Manufacturers, Army, Navy and Police Contractors, Saddlers and Harness Makers.

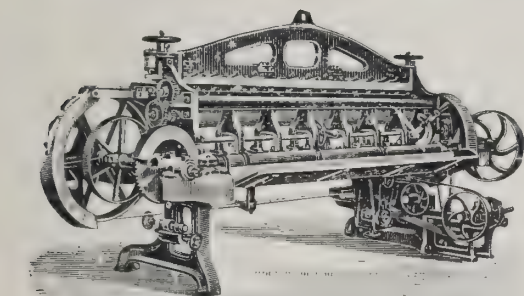
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A B C Code—Standt and Hundin's Code used.



No. 76. Butt Roller for tanners.



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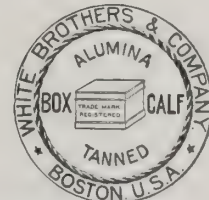
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Both of the above leathers are especially suited for shoemakers in the Colonies and Mexico.

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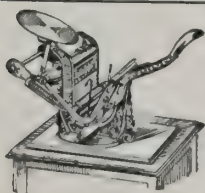
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With Outfits  
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FOR  
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Three Catalogues.



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The Largest Manufacturers of Playing Cards in the world.

### "U. S." Playing Cards.

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39.	Trophy Whist, French size, 2 1/4 x 3 1/2..... Fine finish; large indexes; new brand.	2.00	24.00
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'45.	Texan, enameled; for general stores.....	.90	10.80
95.	Spanish Cards, Spanish size, 2 1/4 x 3 3/4..... Forty-eight cards; finest parchment stock; hard surface finish; permanent colors; superior to the finest Barcelona cards.	2.00	24.00

### "National" Playing Cards.

22.	Rambler, hard process finish.....	.70	8.40
33.	Apollo, enameled, aluminum surface.....	.85	10.20
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75.	National Club, regular size, 2 1/2 x 3 1/2; finest Club Cards.....	2.50	30.00

TERMS: Cash f. o. b. vessel New York, less 2% for shipments of not less than three gross.

Makers of over 1,000 different kinds of Playing Cards. Received "HIGHEST AWARDS" at World's Fair, Chicago.

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WE MANUFACTURE

### STEEL BOILERS of Every Description.

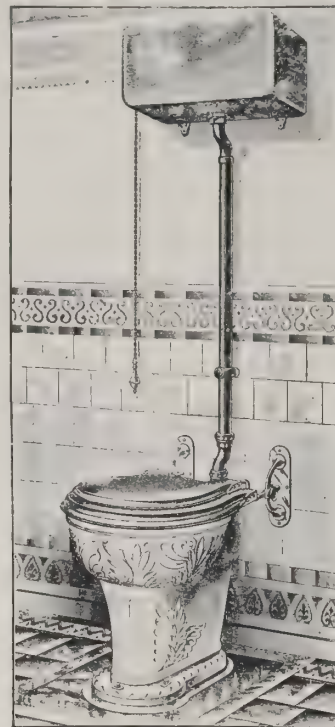


THE BROWN AUTOMATIC ENGINE,  
MARINE ENGINES,  
Single, Compound and Triple.

HOISTING AND MINING ENGINES,  
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LAUNCHES.

GET OUR PRICES BEFORE ORDERING.

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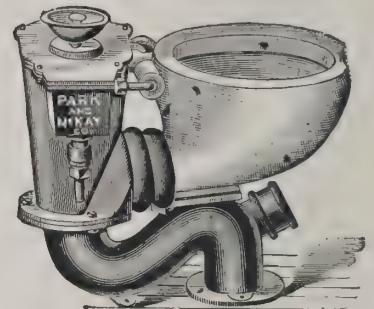


## THE PARK & MCKAY CO.'S Double Trap, Siphon, Jet and Plunger CLOSETS.

EVERY CLOSET GUARANTEED.

Write for prices and catalogues. Send duplicate order to us when ordering through export commission houses.

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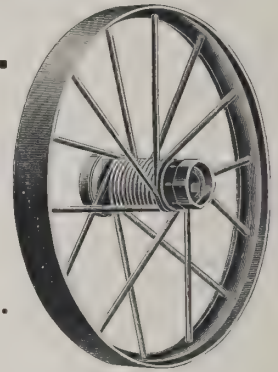
## METAL WHEELS.

Cheaper Than Wood.

Made for all purposes. Wagons, trucks, carts, barrows, implements, etc. Not affected by the weather. Specially adapted to hot climates, but they are good anywhere. State what you want and ask for prices. Address

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### PERU ELECTRIC MFG. CO.

Manufacturers and Exporters of  
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LACLED CARBON BATTERIES.

PORCELAIN TUBES.

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## The Fairest Wheel

Is an invention for the use of dealers as an aid to an increase in sales of

CIGARS, CONFECTIONERY,  
HARD AND SOFT DRINKS

And ANY FIVE-CENT ARTICLE that can be sold  
SIX FOR A QUARTER.

The Fairest Wheel has increased sales double and as high as five times former sales. Over 15,000 in use.

AGENTS WANTED IN EVERY LOCALITY.

Write for price, descriptive circular and testimonials.  
Address

DECATUR FAIREST WHEEL WORKS,  
DECATUR, ILL., U. S. A.



Patented May 7, 1895.

This machine is fully covered by Letters Patent No. 538,916, and all infringements will be prosecuted to the fullest extent of the law.



## The Chadwick Perfect Two Wheelers.

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Safe, Convenient, Elegant Style and Fine Construction. Absolutely Free from Horse Motion and without Weight on Animal. Easiest Riding, Lightest Draft, Strongest and Most Durable One or Two Passenger Vehicle in the World.

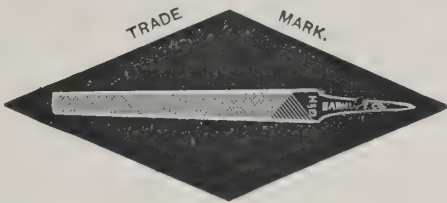
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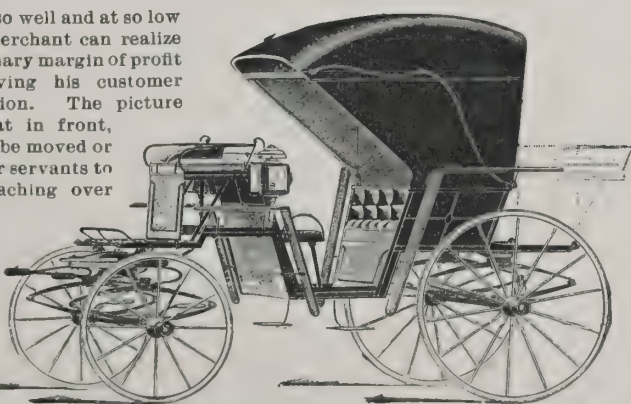
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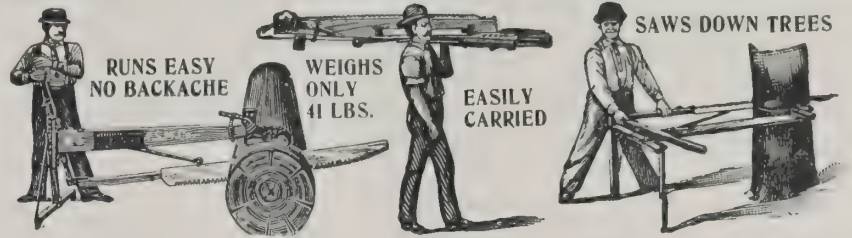
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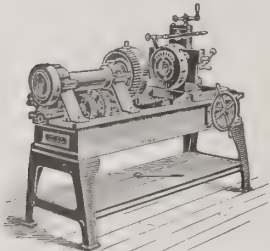
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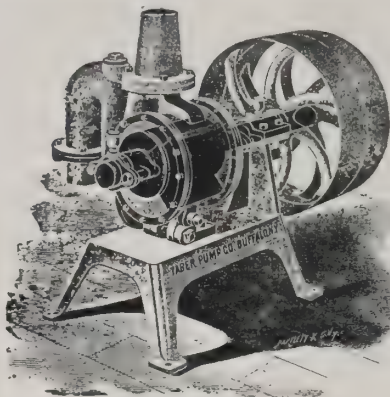


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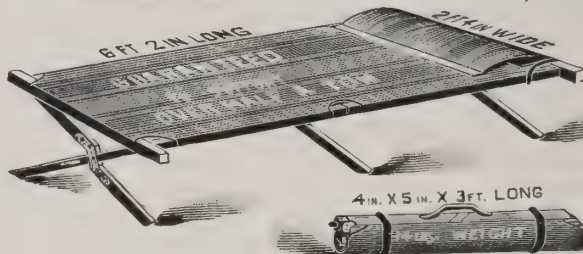
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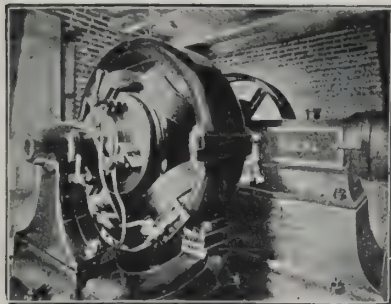
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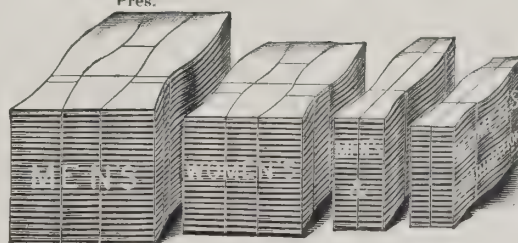
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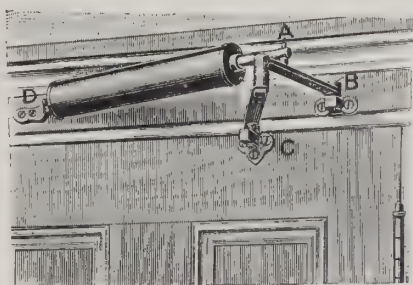


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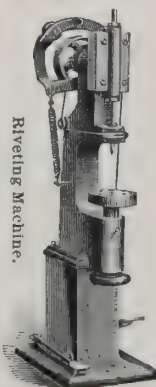
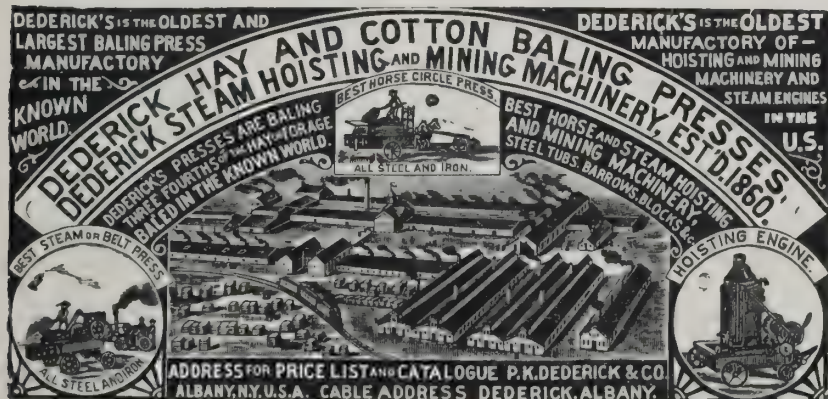


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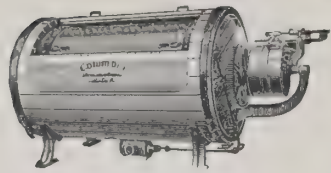
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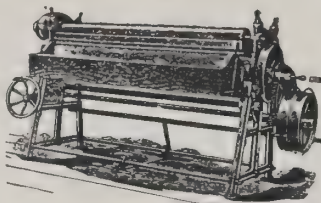
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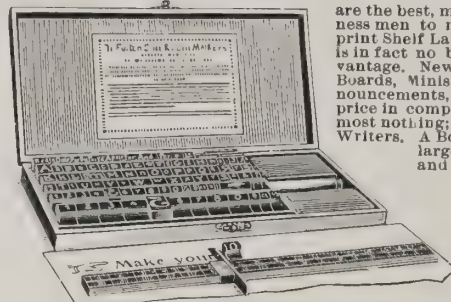
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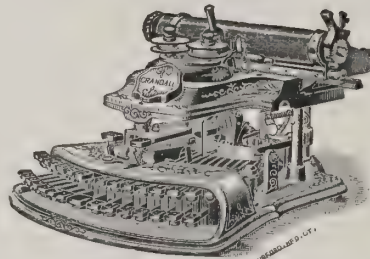
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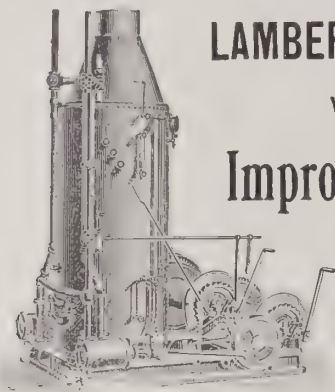
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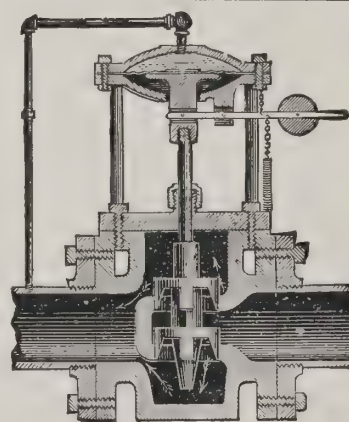
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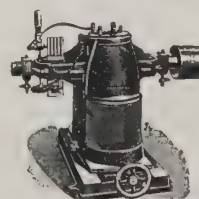
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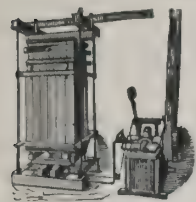
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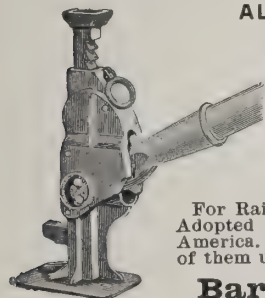
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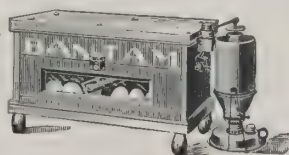


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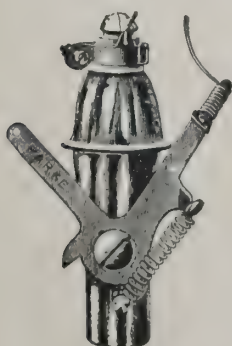
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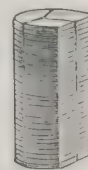
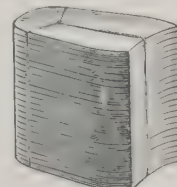
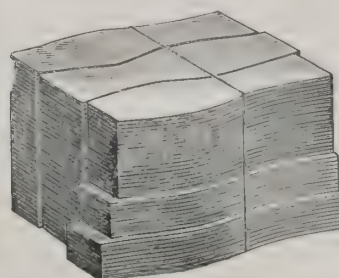
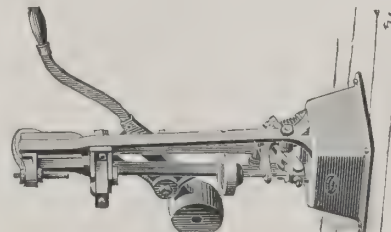
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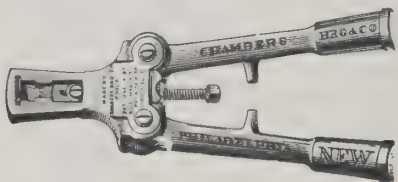
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With Wooden Heads and Handles,  
Warranted not to blacken sugar and su-  
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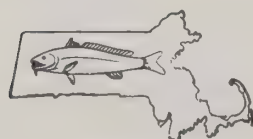
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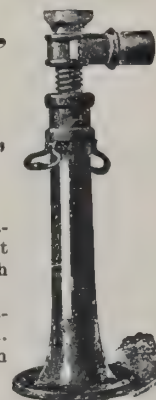
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In 1888—2235 Miles, May 1st to Jan. 1st.

1889—3605	"	Jan. 1st	"
1890—3633	"	"	"
1891—3608	"	"	"
1892—4455	"	"	"
1893—4369	"	"	"
1894—4708	"	"	"
1895—2844	"	"	July 1st, '95.

TOTAL, 28,852 Miles.

(This set replaced a set of Sarven Wheels that were in use one year)  
Price of 1st Set used up in 1 year. } Which is the cheaper  
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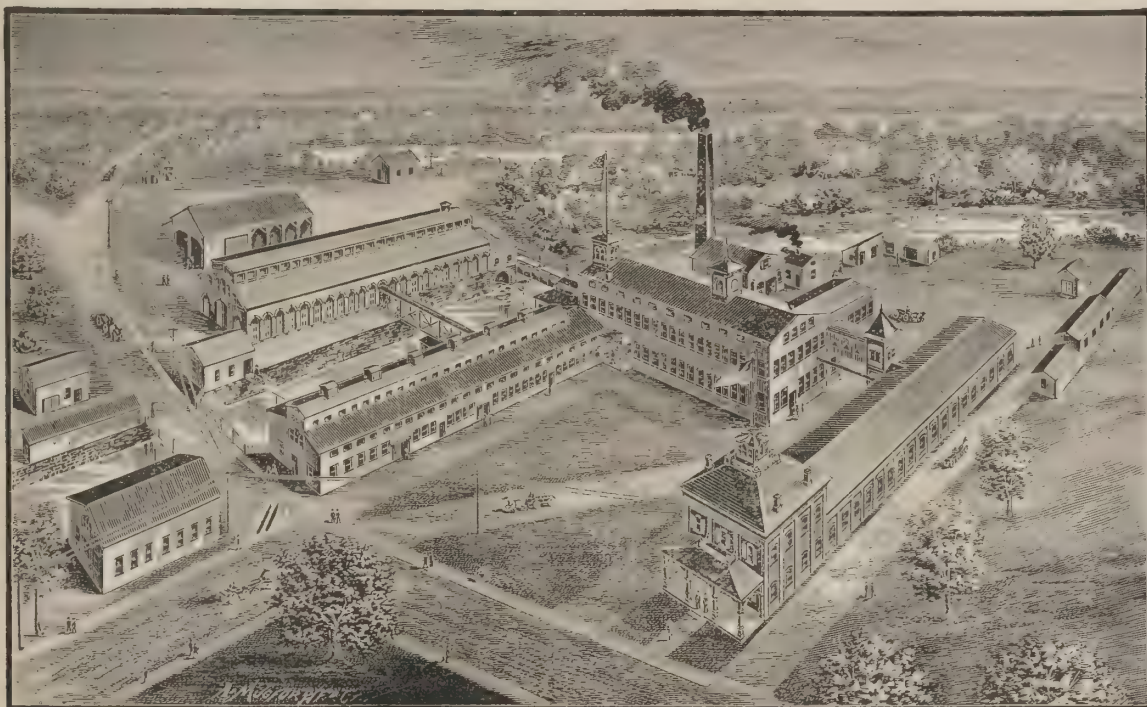


# THE H. D. SMITH & CO.

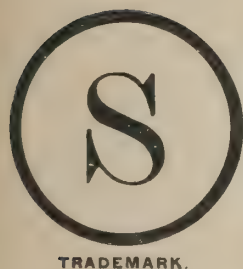
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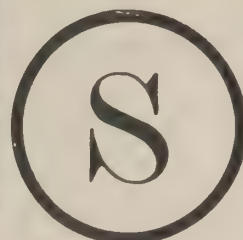
## CARRIAGE MAKERS' FORGED IRONS.



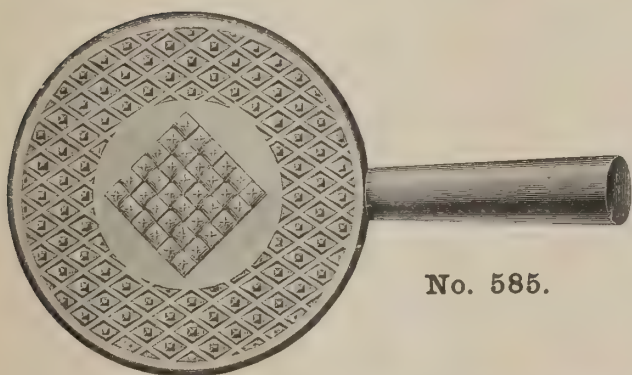
THE H. D. SMITH & CO WORKS; PLANTSVILLE, CONN., U. S. A.



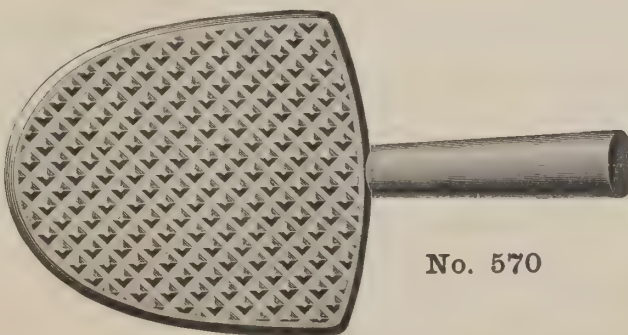
TRADEMARK.



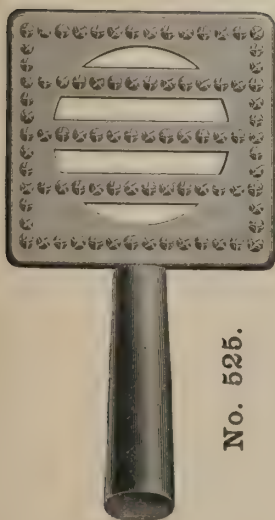
TRADEMARK.



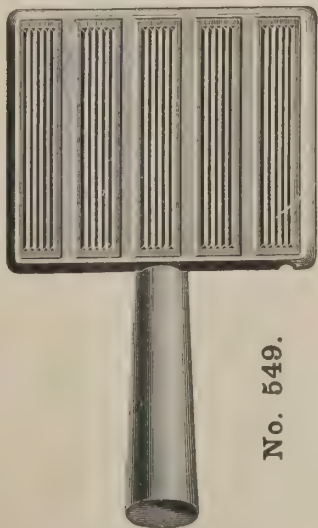
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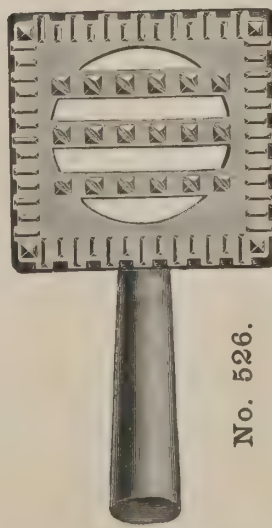
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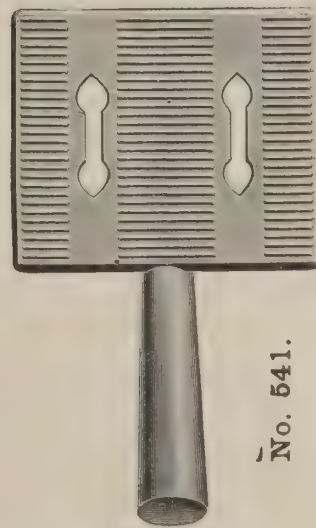
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No. 526.



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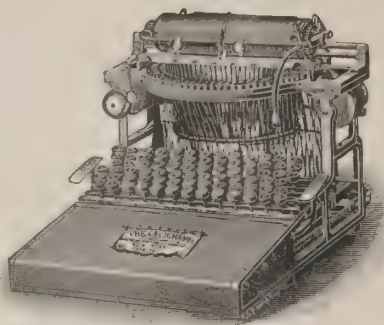
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Than all other factories combined. This is on account of the splendid quality of our vehicles, the wonderfully low price and the intelligent and experienced way we pack, case and ship. Orders received through any export, shipping or commission agents.

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Add for Leather Top instead of Leather Quarter.	4.50
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Add for Child's Seat.	3.00
Add for Spring Cushion.	.75
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N.B.—We build no other vehicle, giving our entire attention to the production of this Phaeton, which is the secret of our low price.

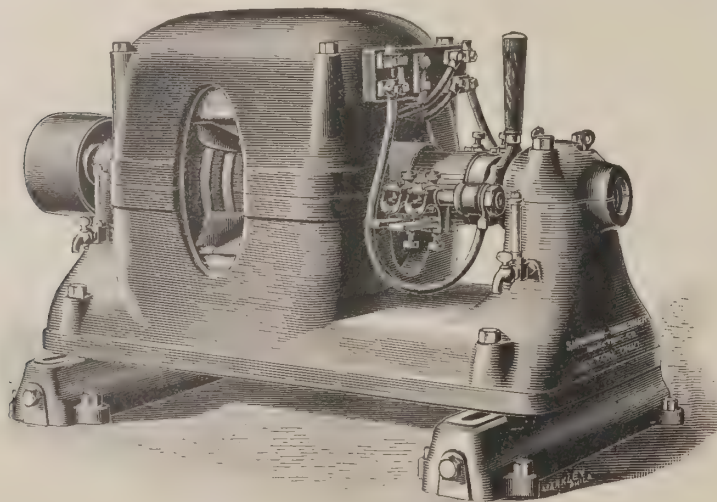
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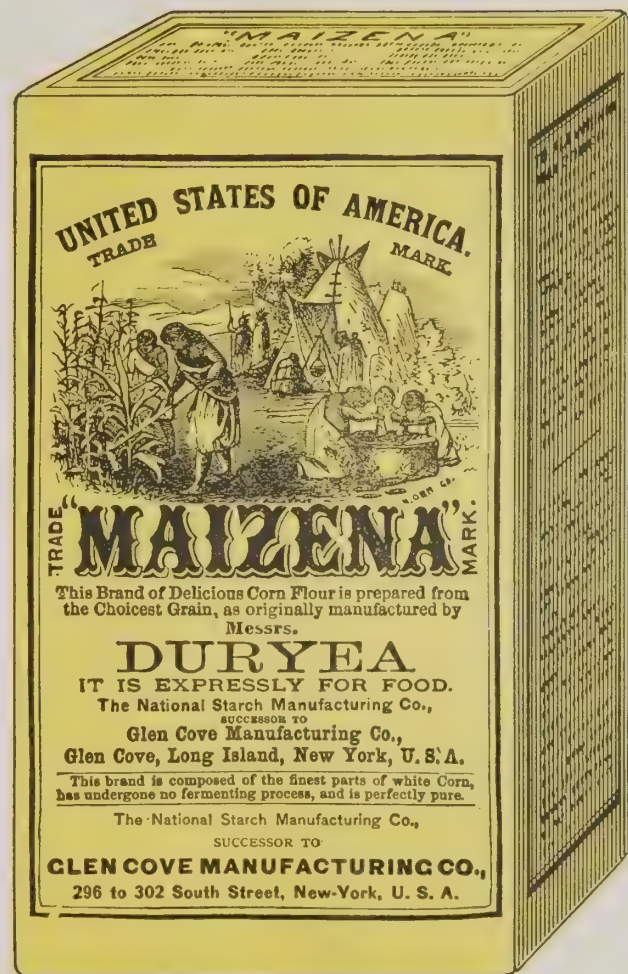
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A BRAND OF CORN FLOUR.

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A DELIGHTFUL TABLE DELICACY.

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It is especially adapted to use in warm climates, being light and easily digested.

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"	"	BRUSSELS,	.	1876
CENTENNIAL	"	PHILADELPHIA,	.	1876
EXPOSITION,		PARIS,	.	1878
"		MATANZAS,	.	1881
"		MELBOURNE,	.	1888
"		PARIS,	.	1889

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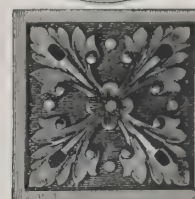
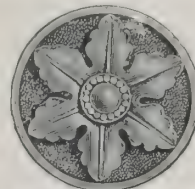
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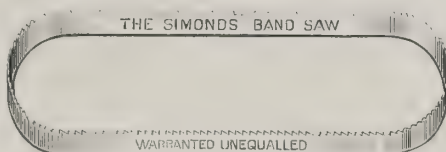
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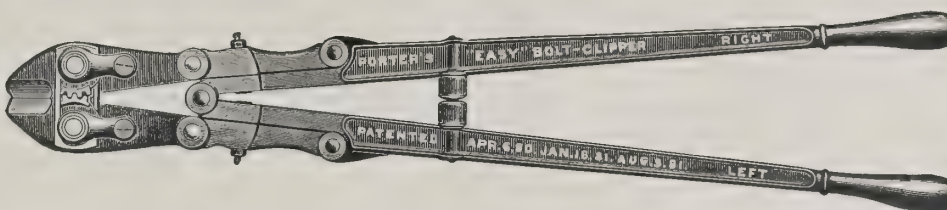
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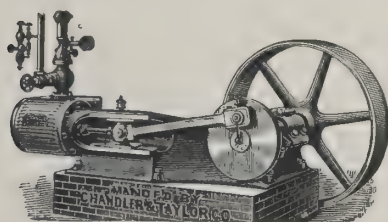
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IS THE BEST.

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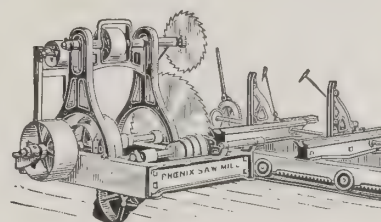
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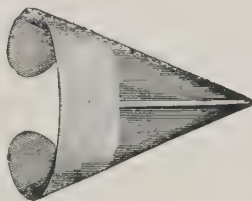
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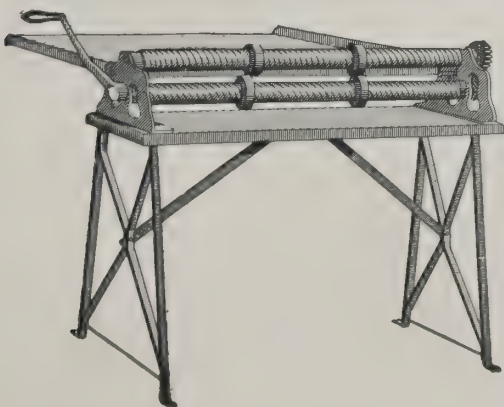
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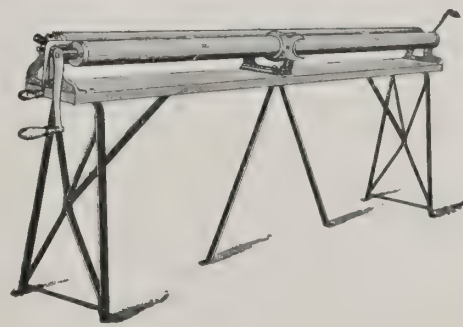
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used throughout the United States.The Capital Rotary Slitting Shears are designed to cut sheet metal  
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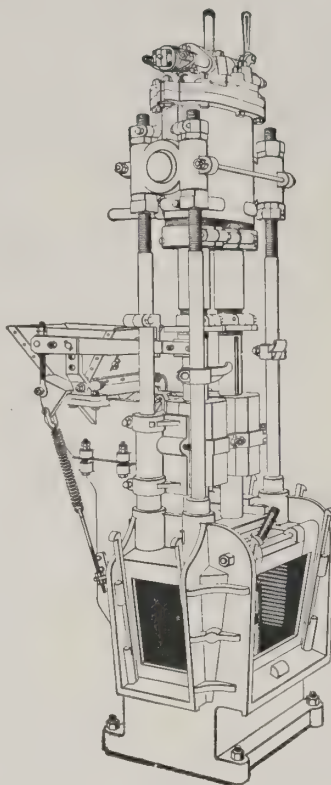
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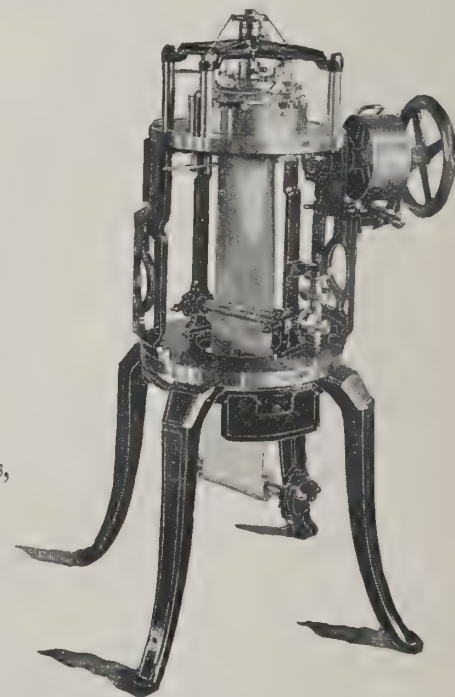
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(Founded by ROOT &amp; TINKER, 1877).

AND

THE AMERICAN MAIL AND EXPORT JOURNAL

(Founded by HOWARD LOCKWOOD &amp; CO., 1877).

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THE AMERICAN EXPORTER is the only independent and impartial export paper published. It is independent because its publishers are not engaged in any other branch of the export business. They are neither export commission merchants nor manufacturers selling agents, and hence they are under no more obligations to one advertiser than to another.

It is impartial because it treats all its patrons alike. It cannot, for this reason, and it does not, publish write-ups or puffs of any specific make of goods, no matter whether advertised in it or not. It charges the same price for the same services to all alike.

We desire it distinctly understood by those who contemplate advertising in THE AMERICAN EXPORTER that space for advertising purposes is sold only upon the merits of the publication for that purpose. For this reason no advertising solicitor or agency has any right or authority to agree to give reading notices or to perform any special service whatever to obtain orders for advertising.

We make it a practice not to discuss the merits or demerits of other export trade papers. Comments on their value may be made with more propriety by those advertisers who have had experience in the use of such publications.

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## ANNOUNCEMENT.

BEGINNING with the current issue, *THE AMERICAN EXPORTER* will for the future carry, in addition to its own advertising and subscription patronage, that of *The American Mail and Export Journal*, the two papers being now one.

*The American Mail and Export Journal* was the pioneer American export trade paper, having been established in 1877, by Messrs. Howard Lockwood & Co.

A little later in the same year Messrs. Root & Tinker began the publication of *THE AMERICAN EXPORTER*.

In character and purpose these two papers were similar, their mission being to disseminate in foreign countries reliable information concerning American goods, and so to stimulate the foreign demand for articles of American manufacture.

For more than twenty years these two journals have followed the same course, separately and successfully.

*THE AMERICAN EXPORTER*, to which has now been added all that was best in *The American Mail and Export Journal*, can justly claim to be by far the most widely known and best-patronized export trade paper published in America. That this fact is recognized by manufacturers and merchants in the United States and Canada, as well as in Europe and other countries, is proved by the presence of their advertisements in its pages.

This we accept as evidence of their approval of the course we have always followed in the conduct of *THE AMERICAN EXPORTER*.

In the future our aim will continue to be what it has always been in the past, viz.: to serve the best interests of our patrons in every legitimate way as publishers, and to make that service effective by conducting our paper in such a manner that it shall preserve the high standing and reputation which it has so long enjoyed, both at home and abroad. *THE AMERICAN EXPORTER* is published in separate English and Spanish editions each month.

#### THE INTERNATIONAL COMMERCIAL CONFERENCE AT PHILADELPHIA.

ON June 1, 1897, an international commercial conference will convene in the city of Philadelphia, Pa., U. S. A., under the auspices of the Commercial Museum, which bids fair to be the most important congress of its kind ever held in the United States. Boards of trade throughout the American Republics have selected as their representatives to this conference their most able trade experts. They will meet similarly selected representatives from boards of trade throughout the United States to discuss commercial questions of high importance. Thus the ablest and most influential business men of the Western Hemisphere will be brought together for the discharge of duties as important and far-reaching as the functions of government.

The high prestige of this conference is attested by the fact that it will be opened by the President of the United States, accompanied by the Vice-President, members of the Cabinet and of the Committees on Foreign Relations of the Senate and House of Representatives.

A banquet will be given to the visiting delegates at the Philadelphia Bourse to commemorate the conference and the 10th anniversary of the organization of the Manufacturers' Club, which has in its membership the principal manufacturers and business men of Philadelphia. It is expected that at least 1,300 persons will participate.

#### TO VIEW THE INDUSTRIES OF THE UNITED STATES.

After the adjournment of the conference the foreign delegates will make a tour of the business centres of the United States. A special train will be furnished for their accommodation. They will become the guests of commercial bodies in New York, Boston, the

principal New England cities, Chicago, St. Louis and other Western centres, stopping at Cincinnati and Pittsburg on the return trip.

The trade possibilities of this conference and of the resulting tour of the United States by the foreign delegates have aroused intense interest. Large subscriptions have been made in each of the cities to be visited for the elaborate entertainment of the foreign guests.

#### AN INTERNATIONAL COMMERCIAL MUSEUM.

This occasion will go far to demonstrate the value of the work done and proposed to be done by the Commercial Museum. This enterprise, which was begun only a few years ago under the clear and far-sighted direction of Professor William P. Wilson, was predestined soon to outgrow its local limitations and become international in its scope and character. This is now its manifest destiny. From its inception this enterprise has been fortunate in commanding by its merits not only the cordial approval, but the active co-operation and best thought of the ablest business men in the city of Philadelphia, the State of Pennsylvania, and beyond these, of men of equal capacity in the commercial centres of the United States and foreign countries. This is shown by the officers and members of the Board of Trustees, among whom are found Hon. Daniel H. Hastings, Governor of Pennsylvania, and several other officials of the State government; Hon. Charles F. Warwick, Mayor of the city of Philadelphia; James L. Miles, president of the Select Council, and Wencel Hartman, president of the Common Council, to whose intelligent support the wisely spent appropriations from the city that furnished the nucleus of the enterprise are due.

At the head of the business men in the Board stands the name of Wm. Pepper, M. D., LL. D., its president, followed by the names of the best and most successful business men in Philadelphia. The members of the Advisory Board for the United States are headed by Henry W. Peabody, of Boston, Mass., as president, followed by W. H. Parsons, of New York, and Robert Bleakley, of New Orleans, as vice-presidents. The foreign Advisory Board is composed of official delegates appointed by the various governments or by representative commercial bodies in Canada, Mexico, Guatemala, Salvador, Honduras, Nicaragua, Costa Rica, Colombia, Venezuela, Brazil, Argentina, Paraguay, Uruguay, Bolivia, Chili, Peru, Ecuador, etc.

The working staff is composed of Professor William P. Wilson, secretary and director, aided by William Harper, chief of the Bureau of Information, with an able assistant in C. A. Greene and Dr. Gustave Niederlein, chief of the Scientific Bureau and in charge of all collections of raw products.

The organization is thus seen to extend far and wide, commensurate with the interests it is so well intended to serve. It should from this time forward be regarded as an international interest to be bountifully endowed by commercial bodies and the governments of all American cities, States and nations on the Western Hemisphere. This will undoubtedly be the outcome of the commercial conference about to be held, as every delegate there present will become satisfied that the good work done by this organization can only be limited by the funds placed at its command.

#### THE FIFTH UNIVERSAL POSTAL CONGRESS.

IN the development of facilities for commerce, postal service has come to be the pioneer of transportation advantages, thus reversing the order of 100 years ago. In the United States the stage coach and pony express opened the way for railroads, with their lightning-express postal trains. On the oceans all governments have aided steamship lines to improve postal facilities as the most direct means of improving commercial relations between nations. For these reasons every effort to harmonize and improve international postal regulations and facilities commands a world-wide interest, and is of the highest importance to all manufacturers, merchants, exporters and importers of every nationality.

The Fifth Universal Postal Congress is now in session at Washington, D. C., the national capital of the United States. Del-



legates representing fifty-five countries are present. Besides the countries holding membership in the Universal Postal Union, China, Corea and the Orange Free States are also represented by delegate. It is interesting to trace the birth and development of this organization.

On August 4, 1862, the Postmaster-General of the United States, Hon. Montgomery Blair, addressed an official communication to the Secretary of State, Hon. William H. Seward, suggesting that the United States should take the initiative in securing "an international conference of postal delegates to recommend measures looking to the revision, simplification and uniformity of international postal arrangements." This is evidence that the stress of civil war, then in its most acute stage of development, did not prevent the Government of the United States from taking a leading part in movements designed to cultivate relations of amity and commercial intercourse between nations. As a result of this suggestion the first international conference of postal delegates was convened in Paris on the second Monday of May, 1863. Out of this conference grew the larger idea of a permanent Universal Postal Union. The first congress of this union met in the national Senate chamber of Switzerland in September, 1874. A treaty creating this union, made between the nations holding membership in it, went into effect July 1, 1875. While the union is young in years, its achievements are phenomenal.

The spirit with which the delegates to the fifth congress of the Universal Postal Union were received by the Government and people of the United States was most eloquently and happily voiced by Hon. James A. Gary, Postmaster-General, in the following words:

"You come as the messengers of peace and good will, as the visible embodiment of international commerce, as the bearers of friendly messages between communities widely separated, yet closely united; and I salute you as the representatives of advanced and advancing civilization. Before you depart for your respective homes we hope to bring you into closer communication with our people, among whom you will find the former citizens and subjects of all the nations of the earth and their descendants. Scarcely a delegate is here who may not receive a cordial and hospitable welcome from natives of his own country, and some of you may find your own countrymen almost as numerous as you left at home.

"We desire also that you may bear away with you a more complete knowledge of our domain, which extends across a continent 3,000 miles, embracing almost every variety of climate; of a country of boundless resources, of infinite fertility, of varied manufacturing interests, and containing a prosperous and happy population of over 70,000,000 of people."

The congress is divided into three general committees. The Committee on Ways and Means is composed of delegates from twenty-four countries; Committee on Registered Mail has members from twenty-three countries; Committee on Money Orders, Drafts and Newspaper Subscriptions is composed of delegates from twenty-one countries. The composition of these committees gives an indication of the world-wide sweep and importance of the subjects under consideration. All the propositions submitted by the various countries to the Universal Postal Union at its headquarters in Berne during the past six years will be referred to these committees for consideration and recommendation to the congress. Among these proposals the following may be mentioned:

1. To transmit the official mail of all countries members of the union free of charge.
2. To increase the unit of freight to be carried for a 5-cent stamp to any point in the world from 1-2 to 3-4 ounce and under, and also a universal stamp of uniform design for all countries.
3. An indemnity of \$10 on all lost registered letters.
4. A method of ordering newspapers of foreign countries by postoffice subscription drafts.

In this connection, among the many blessings which he conferred upon his country, deserves to be recorded the fact that Benjamin Franklin was the first to give equal privileges through the mails to all publishers.

## WILL REVOLUTIONIZE MOTOR POWER FOR RAILROADS.

INTEREST in an experiment made May 10, 1897, on the New England Railroad, between Hartford and New Britain, Conn., will rapidly become universal. According to the testimony of experts who witnessed it, a revolution of motor power for railroads is at hand.

The experiment was an official test of a "third-rail" electrical system, and was the first application of this method of using electricity instead of steam for long and heavy hauls. A run of ten miles was made in 13 1-2 minutes, and with less jar than is experienced in an ordinary railroad passenger car. President Charles P. Clark, of the New Haven Railroad Company, occupied the front seat of the car.

Briefly stated, this experiment means the attainment of a speed of from sixty to seventy-five miles per hour, using electricity as a motive power. Financially it means getting one-horse power out of two tons of coal. A steam engine takes from seven to eight tons of coal for one-horse power.

Experiments were commenced in this direction three years ago on the Nantasket Beach road. It was not believed at first that electricity could be made practicable on any surface of great length, owing to the waste of current in transmission, which would necessitate power houses every few miles. But after many experiments, the electricians of the New York, New Haven and Hartford Railroad Company demonstrated that, by a heavy rail which looks like a letter A flattened down and laid on blocks of wood, the electrical current can be transmitted without any appreciable loss over long distances, and at one-fifth the cost of a trolley line. It was this demonstration that caused the New Haven company to spend a large amount of money in its recent experiment with the "third-rail" system from Berlin to Hartford, a distance of thirteen miles, which was witnessed by electrical experts from all parts of the country and by professors from Yale University.

### LOCOMOTIVES TO JOIN STAGE COACHES IN A SCRAP HEAP.

The importance attached to the success of this experiment by those high in authority in railroad development is shown by remarks reported to have been made by President Clark, of the New Haven road: "You may tell everybody who is engaged in investing their own and everybody else's money in lines competitive with steam roads that they cannot prosper when the day comes to lay down 'third rails' in this country. There is neither malice in this statement nor a desire to injure anybody. Our locomotives may go into the scrap heap, as the old stage coaches had to go."

The competition between trolley and steam roads for suburban patronage has become exceedingly acute in many parts of the country. If a means has been found for successfully supplying electric motive power over long distances for heavy trains, enabling them to maintain a high rate of speed at one-fifth of the cost of trolley transmission, or anything approaching that statement in economy, the near future will witness as rapid a displacement of locomotives on steam roads by electric motors as has been witnessed in the displacement of horses by the trolley system for street railroads.

This is another instance in which the direction of progress may be known, but its limits never.

### SYSTEM OF CONSTRUCTION.

The "third rails" are laid between the running rails. They are banded by heavy copper wire. They rest on blocks of wood clear of the ties. The running rails are used for the return current. The trolley shoe is a flat piece of iron, 12x4 inches. It weighs 20 pounds. This shoe runs along the top of the third rail, just as a trolley pole follows an overhead wire. Inside of this iron shoe a copper wire carries the current to the motor built in the truck of the car.

The current used is 600 volts, 100 more than the overhead trolley system. Although the third rail which carries the current is exposed a shock cannot be taken from it without touching the third rail and one of the running rails at the same time. Even



then it would not be fatal. To avoid the possibility of serious results, however, all the stations are fenced in and danger notices are posted along the road to warn workmen and others.

It is reported that the road will be in regular operation by the "third-rail" trolley system within one month. An account of the first experiments with the "third-rail" system will be found in *THE AMERICAN EXPORTER* for July, 1896. From the information then given and the statements now made the conclusion is not unreasonable that the railroad locomotive has seen its best days and must now give way to the newer power—electricity.

### FOREST TREE CULTURE AS AN INVESTMENT.

TRAVELLERS from European countries in visiting mountainous regions in the eastern portions of the United States are frequently impressed with the extent to which the primeval forests have been removed and have often remarked that the American people with the folly of youth are far more prodigal of their natural resources and advantages than are the older nations of the world. It may not, however, be so generally known abroad as it should be that there is within the United States a very strong undercurrent of sentiment in favor of the proper preservation and cultivation of forests, not only as a measure of health but also as a field of remunerative investment of capital. Under the leadership of the American Forestry Association much pioneer work has been done in this general direction and the significance of the movement is disclosed in the various Arbor Days which exist throughout the several States, by which the school children are required to employ the holidays thus provided in planting trees, and thus their youthful minds are trained to this as one of the most important of their patriotic duties. Thus Arbor Day is a legal holiday in the following States: Kansas, Minnesota, North Dakota, Wisconsin and Wyoming, the day being set by the Governor; in Texas, February 22; in Nebraska, April 22; Montana, third Tuesday in April; Utah, April 15; Rhode Island, first Friday in May; Idaho, on Friday after May 1; Florida, February 7; Georgia, first Friday in December. It will be observed that these days are not identical in the different States but are adapted to the best time for planting trees in accordance with the climatic and other favoring conditions of each locality.

Men of high official station in the United States have frequently departed from the line of their precise duties to give public addresses to encourage and develop this sentiment in the minds of the community and the remarks which were recently made by Governor Daniel H. Hastings, of Pennsylvania, in an address before the Drexel Institute of Philadelphia upon an Arbor Day, from which the following paragraphs have been condensed, deserve more careful consideration by readers in foreign countries than they have doubtless yet received:

Take the value of American forests and compare it with other sources of wealth, the strength of the comparison will be all on the side of the forests' valuation. The value of the product of the gold and silver mines of the United States for the year 1894 is: Gold, \$39,500,000; silver, \$31,422,000. Total, \$70,922,000. The most recent and careful estimate, as the same authority says, of the value of the products of the nation's forests during the same year is \$1,058,650,000, or fifteen times that of gold and silver. The same authority also asserts that if to the gold and silver products of that year the value of all other minerals, including iron, copper, lead, zinc, coal, lime, natural gas, petroleum, salt, slate and building stone, be added, we would have obtained for the value of all our mineral products for the year 1894 the sum of \$553,352,000, or only about one-half of the value of our forest products for the same year.

In Pennsylvania the average annual value of the timber crop for the last ten years has been \$22,000,000 according to Professor Rothrock, the Forestry Commissioner, who is undoubtedly the best authority and at the same time the most enthusiastic forester in the State.

Pennsylvania possesses vast areas of mountainous territory which are of no value whatever as agricultural or mineral lands.

They are, however, of untold value to the State at large because they contain the sources of many of our rivers. Where the owners have removed the timber the land is generally deserted. No attempt is made to restore a growth of timber because it involves a period of time too long for private enterprise.

This article may be fittingly concluded with the following words from Governor Hastings's proclamation on February 25, 1895:

"Of the regions which, when lumbered, were a source of wealth to their owners and to the State not less than 2,500,000 acres are unfit for agricultural purposes. Most of this vast area has little or no mineral wealth and is now an unsightly and practically abandoned territory. Fires sweep over it year after year, destroying the younger growth and burning out the fertility of the soil, and this vast territory is passing into the condition of a desert, becoming poorer each successive year. It is not only possible but practicable to restore the forests upon these desert wastes which would be producing a crop of great value to our State, and would also restore to our rivers and streams the beneficial influences of the forests."

These lands may be bought at a nominal price. Persons in Europe educated to the work of timber culture can here find a favorable opportunity for their vocation which cannot be elsewhere duplicated.

### TELEGRAPHY BY WHOLESALE.

DR. A. C. CREHORE and Lieut. George O. Squier, U. S. A., read an exceedingly interesting paper before a recent meeting of the American Institute of Electrical Engineers on the "Synchronograph," described as a new method of rapidly transmitting intelligence by telegraphic signals by the use of an alternating current. The experiments on which the paper was based were made in the United States Artillery School at Fortress Monroe, Va. Land telegraph and telephone lines were used. By means of the new transmitter exhibited Lieutenant Squier stated that 3,000 words per minute could be sent.

What this means in a business way may be illustrated by the assumption that about 40,000 letters are carried daily between New York and Chicago. But two telegraph lines in continuous operation will be required to handle this entire business by the new method, sending the contents of every letter electrically. Another illustration is given in the statement that it will be possible to publish the contents of a newspaper simultaneously in any number of cities arranging for the service.

Speaking of the telegraphy of the future, based on the new system, Lieutenant Squier said: "The telegraph line of the future will comprise substantial poles carrying a few copper wires worked to their full capacity for transmitting electric signals. The cost of maintenance of such a line will be little more than for the ordinary iron wire now used, while its carrying capacity for intelligence, at 3,000 words per minute simplex, will be about equal to 160 wires used for normal transmission simplex. By duplexing the line the carrying capacity is doubled and becomes 6,000 words per minute."

This is another evidence that the direction of progress only can be known, its limit never.

### NEW TARIFF LAWS.

MANUFACTURERS, export and import merchants of all international trading countries will be interested in obtaining the full text of the new United States and Canadian tariff laws as soon as the measures now under consideration are enacted and become operative. *The Canadian Manufacturer*, of Toronto, Canada, announces that it will publish a special edition, as soon as these measures become law, containing the full text of the new Canadian tariff, the new United States tariff, the British tariff and the British Merchandise Act. These laws will be reproduced from authentic copies obtained from official sources and will be correct and full in every particular. The importance of this publication to the entire manufacturing, industrial and commercial interests of the three countries named and to many persons in other countries is obvious.



## THE YANKEE AND THE CELESTIAL— AGRICULTURE.

IT is announced that Chang Chi Lung, an associate of Li Hung Chang in the governing hierarchy of the Chinese Empire, has sent a request to the Agricultural Academy at Ithaca to designate a farmer accomplished in all the arts practiced by Yankee husbandmen to make the earth yield edible treasures.

It requires no very vivid imagination to foresee the rout of ancient forms and rock-rooted prejudices among Chinese tillers of the soil as soon as American instructors get at work among them. They will be quickly taught that much of the art of American agriculture consists in the art of using agricultural tools and implements, shovels, plows, drills, cultivators, mowers, rakes, reapers, threshers, and about a thousand odds and ends that go to make up the machinery plant of a thrifty American farmer will be brought into demand. The deep stirring of the soil by these appliances, accompanied with scientific chemistry in its treatment with fertilizers and the adaptation of crops to existing conditions of soil, moisture, sunshine, temperature and winds, may confidently be expected to lead to results that will be a revelation of the possibilities of their country to a race that has tilled it for thousands of years. By the intelligent use of resources the progress of industry and civilization is induced.

## WORLD'S EXPOSITION, PARIS, 1900.

IT is probable the United States will make a decided effort to use the World's Exposition at Paris in 1900 as an opportunity to impress upon other nations the wonderful progress made in its industrial development during the century. With this purpose the Administration of President McKinley is in thorough accord. Evidence of this is given in the recommendation by the President to Congress that ample authority and provision for expenses should be given and made for an exhibit on the part of the Government and to enable it properly to co-operate with citizens who desire to make exhibits on their own behalf.

The selection of Gen. Horace Porter as Ambassador to France was decided upon because of his par excellent fitness to represent the Government and people of the United States commercially, no less than socially and diplomatically, during the upbuilding of the great Exposition and the term of its existence. Every undertaking partaking of the nature of a memorial or exposition with which Ambassador Porter has been identified has been an unquestioned success.

Citizens of the United States wishing to exhibit their products or manufactures at Paris will find the arrangements made by Gen. Porter all that can be expected or desired.

## IMPORTANT INCREASE IN MANUFACTURED EXPORTS.

THE exports of manufactures from the United States for the month of March, 1897, were \$6,748,674 greater than for March, 1896. The total amount was \$25,874,469. This is the largest amount of manufactured commodities exported in a single month. Not only this, the percentage of manufactured exports of total exports is larger for March, 1897, than for previous years. The percentage of manufactures to total exports for March, 1896, was 25.85 per cent.; for the year 1896 it was 26.47 per cent. For the month of March, 1897, it was 30.29 per cent. On another page will be found a list of the manufactured articles, an increased demand for which has caused this large total increase, and the amount by which the export of each item has increased. An examination of this list will show the large increases made in the exports of products, in which iron and wood are predominating elements. The United States is rapidly becoming the best source of original supply for these articles. The indications are that exports of this character will continue to increase for a long time.

## SUBMARINE NAVIGATION.

MAN, having been intended by nature to walk upon the land, to fly in the air and swim beneath the waters seems to be his ineradicable ambition. There are no problems that have occupied his mind more persistently than aerial and submarine navigation, and it is eminently fitting that in the closing years of this, the most progressive of centuries, he should cap his many advances with the realization of at least one of these aspirations.

Recently we have heard a good deal about flying machines, but nothing practical seems to have yet been devised. Man has been envying the birds for a long time, but the prospect of his emulating them seems still remote.

With submarine navigation it is different. It is as much more feasible than aerial navigation as the diver's apparatus is more practicable than the clumsy balloon. Indeed, it is rumored that there are submarine vessels actually in existence whose capabilities are known to the war offices of the different governments, but the subject has hitherto been enveloped in such mystery that to the uninitiated it should be a matter of satisfaction to know that a submarine boat has at least been launched in public and in the light of day, even if her submarine capabilities have yet to be proved.

The new vessel, named the "Holland," after her inventor, is intended for purposes of war, primarily the torpedo service, although provided with guns both for submarine and aerial use. Her dimensions are 15 feet in length by 10 1-4 feet beam; her displacement is seventy-four tons. She is propelled by a single screw, worked by a gas engine on the surface and electricity when she is submerged. Her electric motive power consists of a motor with a storage battery which will deliver 150 horse-power for one hour, giving a speed of 14 knots, or fifty horse-power for six hours, which will enable her to run at the rate of 8 knots an hour. Her surface speed will not be remarkable, but that is a matter of minor interest. For armament she has a single 18-inch torpedo expulsion tube in her bow, an aerial dynamite gun forward and a submarine dynamite gun aft. The crew will consist of six men, who, when under water, will be supplied with air stored in reservoirs at a pressure of 2,000 pounds. Should she come up to what is expected of her the "Holland" will be thoroughly manageable, as her rudders and water ballast are so arranged as to allow her to rise or sink at a moment's notice. Having a powerful hull she will be able to stand the pressure of 150 feet head of water, but in warfare it is unlikely that she will ever have to sink so deep.

That the "Holland" cannot stay under water for a week, running at a speed of 20 knots an hour, may be a disappointment to wonder seekers, but the fact that nothing preposterous has been claimed for her renders us more hopeful of her success. It is, of course, too early yet to criticise, as she will not be tested until next month, but the fact that a submarine torpedo boat has actually been launched, after all the talk, is considered an event of importance in marine history. Should she accomplish all that is expected of her it is claimed that she will prove the most formidable engine of destruction ever invented and will cause a revolution in naval warfare.

The consensus of expert opinion is that the "Holland" will prove a success; but submarine navigation is so wonderful, and wonders are so disappointing. On the other hand, we must remember that our country has been peculiarly successful in the matter of naval innovations. It was an American citizen, Ericsson, who by his iron Monitor, gave birth to the modern navy. It was an American citizen, Robert Fulton, who first applied steam power to navigation. Indeed, the submarine vessel itself, in some form or other, was conceived by Fulton 100 years ago. For it is known that he submitted to both the English and French governments plans of a boat that would travel beneath the surface, and, he claimed, annihilate the fleets of the enemy. His proposals, however, were declined, first, because the scheme was considered impracticable, and secondly, because the sailors of that day scorned such underhand methods of warfare, or at least so they said. Finally, it is to be remarked that the "Holland" herself is not altogether a leap in



the dark, for she is modelled after an actual submarine craft, which was tested in New York Bay, and pronounced, if not practical, at least encouraging.

Peaceful folks may hold that the introduction of a new engine of destruction is no matter for rejoicing, but if they consider they will perceive that the effects will probably be the contrary of what they dread. The more deadly the implements of war the less the popularity of war itself, so that every new destroyer of life indirectly hastens the millennium of peace on earth. Again, submarine ships can be employed for other purposes than those of war. There is a large field for their use in wrecking operations, harbor surveying, submarine exploration and scientific investigation, not to mention the recovering of countless millions of long-lost treasure. Finally, a submarine vessel rendered possible only by electrical invention, it follows that the success of submarine navigation will give a stimulus to electrical ingenuity and to electrical industries everywhere.

### Rapid Growth of Our Export Trade.

THERE is proof now, in the form of statistics which cannot be twisted to any other purport, that the United States can export its domestic products without paying shipping bounties. Equally incontrovertible is the attendant demonstration in figures that there is a market for American goods outside of the domestic circle of consumption. Take the simple statement that the exports of manufactures for March exceeded those for any month in the nation's history, and it is plain that something extraordinary has been going on since 1891, 1892 and 1893, when, with reciprocity conventions in existence, the ratio of the average monthly output of manufactures to that for the month ending March 31st last was as fourteen to twenty-five.

The foreign trade reports for March show the best record yet made in the exportation of domestic manufactures. A total of \$25,874,469 was exported, or \$2,000,000 more than the largest month's exports heretofore, which was in December last. The gain in this respect is shown by the fact that the total is an increase of 30 per cent. over March, 1896.

The actual gain in exports of manufactured articles during March, 1897, over March, 1896, was \$6,748,674. The gains on specific lines were as follows:

Agricultural implements .....	\$225,784
Books, maps and engravings .....	53,369
Brass and manufactures of .....	47,842
Carriages and vehicles .....	5,107
Chemicals, drugs, dyes and medicines .....	283,369
Clocks and parts of .....	7,692
Watches and parts of .....	22,355
Copper, manufactures of .....	44,921
Cycles and parts of .....	787,579
Glass and glassware .....	22,694
Ink, printers' and other .....	4,233
Scientific instruments and apparatus .....	153,004
Cutlery .....	4,813
Locks, hinges and other builders' hardware .....	161,139
Saws and tools .....	37,429
Sewing machines .....	65,657
Locomotive engines .....	274,940
Stationary engines .....	26,551
Boilers and parts of engines .....	20,054
Machinery (not including printing presses, typewriting machines, boilers, and fire, locomotive and stationary engines) .....	530,042
Scales and balances .....	17,623
Wire .....	108,501
Lamps, chandeliers, etc. ....	16,589
Boots and shoes .....	18,405
Harness and saddles .....	15,253
Organs .....	10,905
Paints, pigments and colors .....	29,115
Paper and manufactures of .....	78,455
Perfumery and cosmetics .....	4,906
Plated ware .....	18,293
Soaps .....	9,448
Stationery, except of paper .....	18,564
Varnish .....	7,068
Wood, manufactures of .....	192,913

This has been brought about without reciprocity. Trade has flowed outward in a larger volume than ever on certain lines which are essentially bound to our welfare, and when, moreover, it was not barter, which is supposed to be a collateral basis of reciprocity. The most singular phase in connection with the matter is that it has shown itself to our citizens, not between the United States and those countries merely which tariff experts have thought offered us the best openings for goods, but also in all cases where barriers have not been opposed to the ordinary movement of trade. Even the markets in certain countries which have put up strong defenses of this character have not prevailed wholly against the new business. The inference to be drawn is obvious. Goods are always seeking the best market, and the United States manufactured products have found their way wherever they could discover a reasonably promising opening. Our merchants, compelled to look over a broader field than formerly for business, have sustained themselves by picking up customers in foreign lands, and entirely new ones at that.

The enlargement in the sale of our manufactures abroad reflects to a considerable degree the development of our industrial organization.

It is possible that the country has been making much more rapid progress towards its proper position in the world's markets than anybody can now accurately measure. That it has achieved a real triumph cannot be denied at any rate. The idea that the manufacturers will distribute \$40,000,000 worth more of their productions abroad this year than they did during any previous year in the country's history should satisfy any one on this point.

### The Submarine Torpedo Boat Holland.

THE launching of the new submarine torpedo boat Holland, at the Crescent Shipyard, Elizabethport, N. J., which took place the other day, is considered by naval experts as an event of great importance. If the Holland accomplishes all that is claimed for her, she will prove the most formidable engine of destruction ever invented, and will cause a revolution in naval warfare akin to that produced by the appearance of Ericsson's cheese-box monitor.

She is a long, cigar-shaped, cylindrical shell of steel, 53 feet over all and 10 feet 3 inches in diameter at the widest part amidships. The upper half is painted a dull gray color and the bottom covered with red lead. With the exception of a narrow flat hood several inches high along the top there is nothing excepting the conning tower to break the cylindrical and tapering lines of the craft.

At the stern are attached a powerful propeller and twin perpendicular and horizontal rudders, all protected by a broad hoop-shaped band of steel. There are "dead eyes" and valve openings here and there over the hull.

The Holland will be run by a gasoline engine when on the surface, and by a dynamo when totally submerged. It is expected she will go eight knots an hour under water and ten knots on the surface. Six men will constitute the crew, and when under water will be provided with air stored in reservoirs at a pressure of 2,000 pounds.

Her armament consists of two torpedo tubes in the prow, one for aerial projectiles and the other for Whitehead torpedoes, and a submarine gun at the stern. The boat can be submerged by means of the rudders and water ballast in less than a minute.

### Our Railroads.

AN imperial commission came to our country last year, to study the American railways, keep a record of their observations, and report to the German Government. The report was lately filed and our consul at Chemnitz, Mr. J. C. Monaghan, has sent an abstract of it to the State Department at Washington.

Those German experts state, with emphasis, that our roads are greatly superior, in many respects, to the roads of Europe. Our through car system, especially our sleepers, the service of the latter, the speed of our trains. Our companies are more liberal in carrying baggage, sleeping berths are not only better but much cheaper. Railway fare is cheaper here than in Europe; our trains are better lighted.

We may remark here that no government railway service equals, or ever can equal, our service, which is furnished by corporations. The British and United States systems are far superior to all others, and we lead the British roads in many respects. We get cheaper fare and much lower freight rates. We are not subjected in this department to bureaucratic management that would become intolerable to the American people in a very short time indeed. Even the English railways charge much higher rates of fare and freight than our roads do, chiefly because of the very high cost of the English roadbeds and the higher price of fuel.

Unquestionably we lead the world in the excellence of our railroads and the service they render is much superior to that furnished by European lines.

And here is a good place to say that government railroads are failures, viewed from our American standpoint. In Europe they are owned by the governments, as part of the war equipment, the industrial service they render being incidental. Of course such roads, so held and directed, cannot be of the highest possible use to the people; and while our roads would be indispensable to the government in case of war, they are built and conducted, primarily, for the purposes of commerce. Their service, as a war facility, was a temporary incident during our civil strife, and the roads promptly fell back into their vocation as commercial arteries when the war was ended.

Brazil has had a sore experience with her thousand miles of State built railroads. That republic would be glad and thankful could she give her roads to some company that would certainly make them efficient, paying properties.

The United States have been wise in letting the people do their own railroading; there will be no doubt of the correctness of this assertion in the mind of any one who shall have looked over the railroad history and conditions of the other nations.—*The Tradesman*.

A COMMITTEE representing American manufacturers and exporters, it is said, has been organized to visit the approaching exhibition at Stockholm and European manufacturing centres generally with the view of collecting information as to European industrial conditions and methods of doing business. The committee will issue a report on their return giving their conclusion as to the prospects of an outlet for American manufactures. "There is no doubt," said a man interested in the export trade with Europe, "that a serious attempt to establish an organized export trade now forms a prominent feature in American general manufacturing policy."



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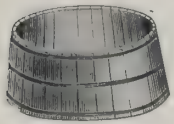
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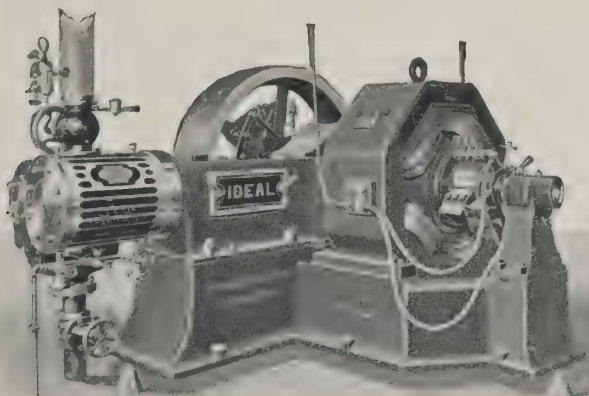
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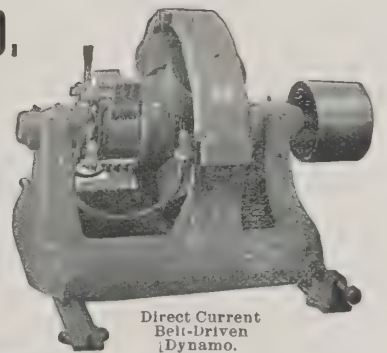
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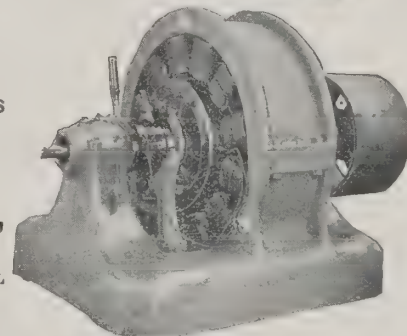
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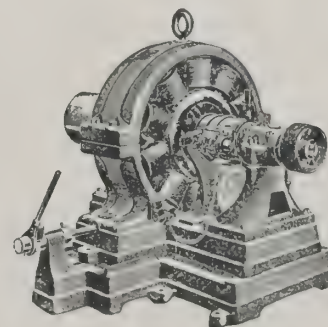
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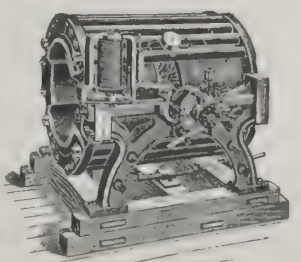
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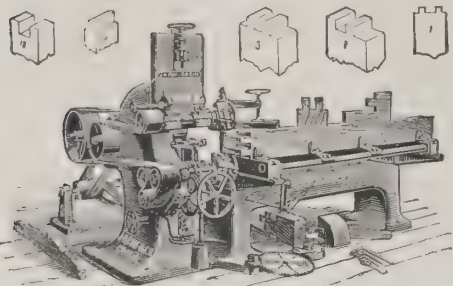
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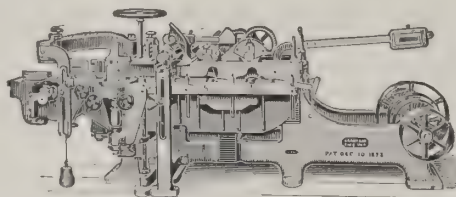


## Words of Advice to Woodworkers:—

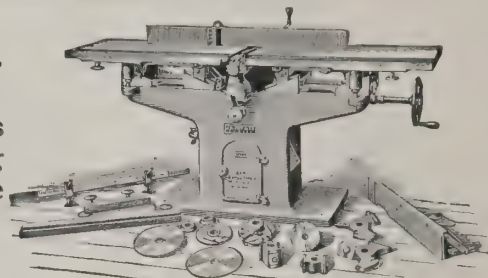
When you buy machinery don't take the first lot offered because it seems cheap, but permit us to figure with you. We manufacture more Woodworking Machinery than any other concern in the world, and guarantee ours to be **THE BEST.**



No. 5.—Universal Car Tenoner.



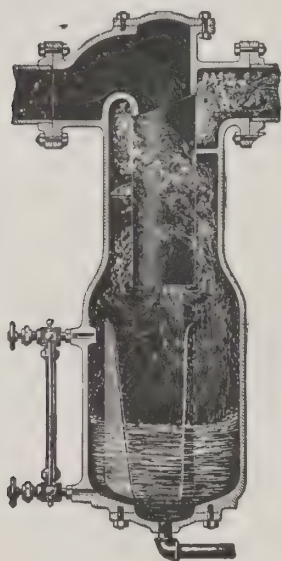
No. 5.—Extra Heavy Molder (10, 12 or 14 in. wide).



No. 3—Variety Wood Worker.

In writing, to save time, tell us about what you want that we may submit illustrations and prices of machines adapted to your use in the first letter to you.

**J. A. FAY & CO.,** 251-271 W. Front Street,  
Cincinnati, Ohio, U. S. A.



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TO OBTAIN  
**DRY STEAM.**

Place a **STRATTON SEPARATOR** in your steam pipe. Over 400,000 horse power in use. This is the only apparatus that automatically separates water from steam and secures the maximum of economy, efficiency and safety. These Separators are used by the U. S. Navy, by the leading Electric Light Co.'s, Paper Mills, Water Works, Railroads and Steam Vessels; also extensively used on many of the large Sugar Plantations of the West Indies and the United States, and in the largest Sugar Refineries.

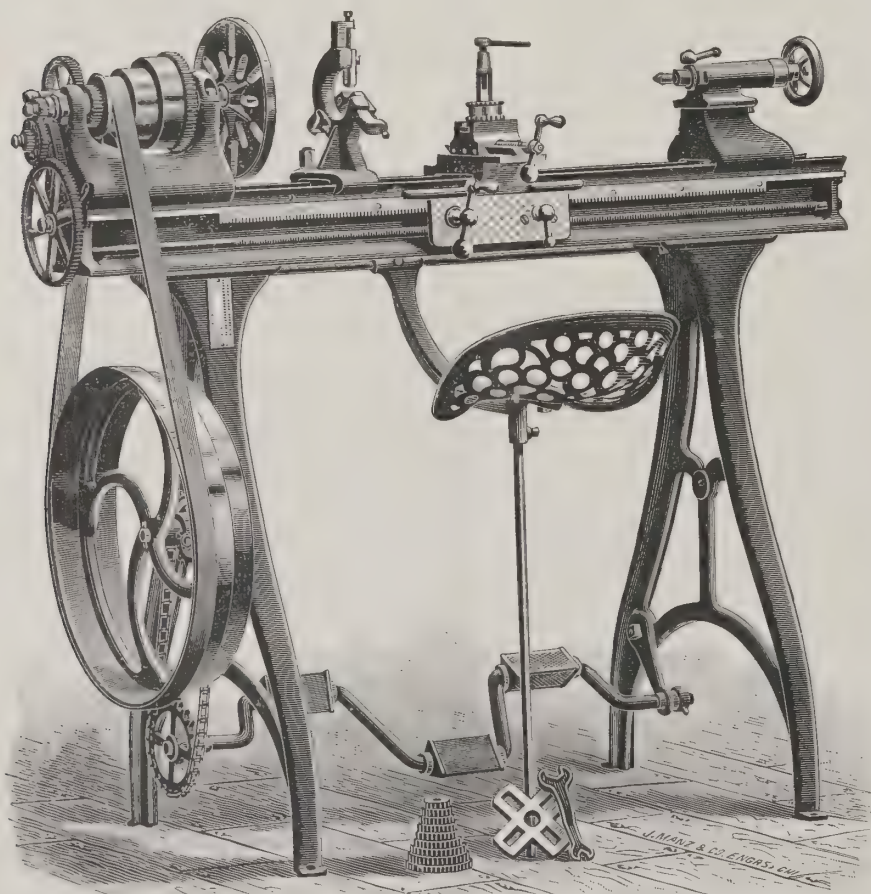
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DEVOTED TO THE FOREIGN TRADE IN MACHINERY AND HARDWARE.

### Indian vs. American Plumbing.

AN Indian journal speaks in highly commendatory terms of the excellence of American plumbing, as well as domestic heating, lighting and ventilation. Its criticism is prompted by the perusal of an American plumbing paper, and it refers with envy to the convenience of an American house. Among other details are mentioned "the steam heating apparatus, which is a radiator of artistic form, that may be placed in any room having pipe connections, and is generally removed in Summer. It dispenses with a fireplace and involves no labor except that of turning the steam on and off. Their heaters for these are of infinite variety, many of them being self feeding with regard to fuel. There is a domestic furnace which dries and burns all the garbage from a house of any size; waste papers, old boots, clothing, baskets or other unsalable materials are thus quickly disposed of. The smoke passes into the house chimney. Their bath and closet fittings are an equal credit to art and science. In everything there is evident a striving to economize time and labor by leaving the fitter nothing to make." In contrast to this is given a sketch of the Bombay plumber of the average sort, who, it is stated, would be a mine of wealth for a New York comic paper. His workshop is like a marine store, where second-hand materials are more conspicuous than new stock. The new stock is one of the cheapest description that money can buy, and much of it would bear no proper test. He puts in second hand and half-worn material wherever he can and charges all he dare for it. His charges are based on what he thinks he can get out of his client, modified by an abatement, without which no client would give him an order. There must also be a lot of talking, in which each party makes the other understand that he is not honest, and on this mutual basis the bargain is struck. As a rule, nothing is written down or specified, and if in the course of execution extra scamping can be introduced by the plumber it is done. So "rain spouts are made of old kerosene tin; water tap valves are repaired with old rubber; loose pipe screws are tightened with a bit of rag or string or putty; cracked iron pipes are patched, painted and sold as new; gutters are made of sheet zinc as thin as paper, and the plumbing trade can only be compared for degradation to the pass to which the Indian growth of cotton has come." It is hardly surprising that the Indian editor is enthusiastic about American plumbing.

### Beer Machinery for Japan.

JAPANESE beer drinkers will soon have an opportunity to drink beer brewed by a strictly American process. This will be the result of a visit paid to Pittsburg by Mr. Huedz Ikuta, manager of the Osaka Beer Brewing Company, whose four breweries are at Simla, near Osaka, Japan.

Until about 1888 the Japanese had been drinking either beer imported from Germany, or were contented with sake, a wine made from rice. At that time Mr. Ikuta went to Weihenstephaner, Germany, a great brewing centre, near Munich, where for three years he studied the German brew. Going back to Japan he established the breweries he owns at Simla and several smaller ones at other points, thus starting the beer brewing-industry on the island.

Mr. Ikuta's visit to this country was caused by notices in a Japanese newspaper of the complete beer brewing equipments being shipped to Australia from the United States. He discovered that an American had invented a process by which beer is carbonated with the gases arising from itself during the brewing process in an absolute vacuum, saving time and expense. At once he started for San Francisco, and two weeks ago commenced from that point a tour of the principal beer-brewing cities in this country. He has visited Denver, Milwaukee, Chicago and St. Louis. From this city he goes to New York, going once more to Germany. Returning thence, he will stop again in Pittsburg, when he will purchase an entire outfit of the new machinery.

Mr. Ikuta said his countrymen have just embarked on a period of remarkable purchasing of machine supplies from the United States, notably in the oil and electric-light business.

### Machinery in Tall Buildings.

AMERICAN enterprise in the erection of big buildings for business purposes has become known the world over. Twenty-five story structures have ceased to be startling wonders to inhabitants of the large cities of the United States, and "skyscrapers" of even more commanding heights are the talk of many prospective builders. For the engineer these piles of stone and metal hold varied and important interests. From the beginning of their foundations his

services are indispensable, and after completion, the maze of machinery which they hold, continues to require them, for advice as well as management. Like the modern ocean steamship, the large business building of the present day harbors, deep down, out of sight of all but the operating force, a magazine of power of which the proportions are but vaguely guessed at by the multitude above. Boilers, engines, dynamos and pumps there are in bewildering numbers, supplying heat light and power to the upper regions through miles of pipe and wire, humming blowers and exhaust fans both supply and abstract air through many-branched ducts for ventilating purposes, and ice and refrigerating machines, too, often must have a place, all helping to make up a machinery equipment of magnificent extent. One measure of this—perhaps as good a one as can be given—is the money value of the outfit. In one building, a hotel structure, now going up in the city of New York, the cost of the steam power, heating and ventilating plant will be in the neighborhood of \$250,000, or about £50,000, while that of the electric-lighting installation will figure up to even more, \$300,000, or about £60,000.—*Cassier's Magazine*.

### Mr. Edison's New Invention.

THE persistence which has characterized all the efforts of one of the greatest inventors of modern times is once more crowned with success. The town of Edison, N. J. (named for the inventor), will after May 1st next become one of the largest shipping points of iron ore in the country, the works having a capacity of 1,200 tons per day. The method of working low-grade ores by mechanical means, namely, the attractive power of magnets, upon which Mr. Edison has spent years of time and fabulous sums of money, is now complete. It is said that practically the whole of the machinery of the immense plant there has been designed and invented by Edison and is owned by a stock company of which he is president and controlling stockholder. In the northern part of New Jersey is a stretch of low-grade ore averaging about 20 per cent. Mines, once very profitable, have long been abandoned, as the percentage is too low to be profitably operated by former methods. In the improved method the ore is mined by blasting and conveyed by electric motive power to the crushers, where it is reduced to the fineness of dust. Conveyors take it from the final rolls and carry it to the top of a mill ninety-six feet high. On its pathway to the ground some 400 electro-magnets are distributed. These powerful magnets are 4 feet long and have poles 4 inches square and are so arranged that the falling ore and sand from the top of the building to the ground passes about two inches from the faces of the row of magnets. The iron ore in the mass is thus deflected from the vertical course of the main mass and attaches itself to the magnets, until the accumulation becomes so great that it falls of its own weight and is led by a V-shaped partition into a pile by itself. From this pile the ore is conveyed to the bricking plant and dumped into mixing troughs, where by means of screw-faced revolving cylinders it is mixed with a "binder" and fashioned or molded into briquettes of suitable size. The present capacity of the mill, which is to be doubled, is 300 tons of ore per hour. Of this 20 to 25 per cent. is iron and the remainder refuse or sand.

### American Tools Abroad.

KARL VON MEYENBURG, of Zurich, Switzerland, is making an extensive tour through the United States as the representative of a large manufacturing concern in his native city. He will visit nearly all of the large manufacturing centres of this country before his return to Switzerland, which will not be until September, and he expects to find much in the meanwhile which will aid the concern by whom he is employed. This is his second visit to America.

In a recent interview in Worcester he said: "My object in coming to this country is thoroughly to investigate the design and construction of American machine making tools. In machine-tool construction America beats the world. The finest lathes, planers and all tools used in the manufacture of other machines can be bought in this country. Foreign manufacturers are beginning to realize this and to buy largely in this country."

Manufacturing interests are greatly on the increase in Europe, and machine tools are being bought in great quantities. It is a great opportunity for the American manufacturers of tools, for the European market cannot supply the demand and the European manufacturer prefers the American product if he can get it. The American goods are being exported largely, and that is what keeps your machine-tool shops so busy in the general dullness of trade.



## Sent Round the World.

AMERICA is the sewing machine centre of the world, and New York is the centre of the sewing machine industry of America. "In this city," says the *Sun*, "nearly all the factories producing these machines are directed and controlled, and fully 90 per cent. of the sewing machine trade of the world is managed and handled here. The production amounts to more than 500,000 machines annually, and nearly 100,000 persons in one way or another make their living out of sewing machines, either as factory operatives, agents, clerks, canvassers, collectors, or in some other capacity connected with the making and marketing of machines. One of the largest of the companies has an agency of its own in nearly every city, town and village in the United States, besides being represented by its own agents in every city of importance throughout the world.

"The American sewing machine, like the American watch and the American reaper and mower, is the standard of excellence for the civilized world, and the export trade in sewing machines penetrates to the uttermost ends of the earth. New York is the great sewing machine centre of the world because, in addition to being the headquarters of the industry in the United States, it is the home of a company which operates several factories in Europe, among them one in Scotland, where 6,000 persons are employed. The machines manufactured abroad under American patents are not included in the statistics of the export trade, though their manufacture in Europe cuts off our export trade to that extent. Everywhere throughout Christendom the American sewing machine holds the market against all competitors. It is not a question of price, but of merit, quality and reputation. The only country that is making any headway in the struggle for the sewing machine trade is Germany. There they have gone into it seriously, and are turning out machines that show a great improvement over their product of a few years ago.

"Germany is hot after us for the world's market," said a sewing machine importer, "and she is making such excellent machines that the competition threatens to become important to us. German manufacturers have some facilities which Americans do not have for obtaining advances from their banks upon goods consigned to foreign markets, and they can give their commission men six to nine months' credit on all machines handled by them, and the same credit is extended to the buyers wherever they may be located. Here in New York the sewing machines for export are sold for cash, and no credit is extended to the buyer. We are therefore at a disadvantage in this respect, and Germany is increasing her foreign trade at our expense. She is making a strong bid for the South American trade, and is meeting with considerable success. German efforts to sell sewing machines to France have not fared so well. No matter how low the price or how long the credit, the Frenchmen will not buy of their enemy, but keep on taking American machines."

"The money value of sewing machine exports for the year 1895 and for the thirty years ending with 1895 was as follows:

	1895.	Total for 30 Years
Austria-Hungary.....	\$12,160	\$81,709
Belgium.....	36,200	780,846
France.....	98,566	2,645,045
Germany.....	472,203	15,417,683
Holland.....	22,613	403,800
Italy.....	8,756	204,321
Portugal.....	77	15,039
Russia.....		130,580
Spain.....	1,314	78,977
Sweden and Norway.....	8,919	101,658
Switzerland.....	100	8,729
Turkey.....	137	25,865
Great Britain.....	645,847	22,952,623
British North America.....	111,388	2,123,023
British Australasia.....	224,875	4,425,056
British West Indies.....	13,628	241,136
Hayti.....	4,906	123,428
San Domingo.....	1,817	70,908
Cuba.....	16,114	2,241,264
Dutch West Indies.....	1,069	68,841
Denmark.....	1,958	34,161
French West Indies.....	1,849	32,239
Puerto Rico.....	2,230	212,768
Mexico.....	132,841	4,018,182
Central America.....	64,976	903,967
British Guiana.....	3,189	21,182
Dutch Guiana.....	324	1,644
French Guiana.....	1,314	5,911
Colombia.....	39,924	2,620,533
Bolivia.....	830	5,329
Ecuador.....	11,492	147,249
Brazil.....	140,054	2,310,249
Argentina.....	53,504	1,481,760
Uruguay.....	13,317	329,734
Venezuela.....	46,248	979,615
Peru.....	8,609	493,712
Chili.....	21,894	569,122
Africa.....	7,823	162,681
China.....	3,001	90,317
Japan.....	3,465	91,632
Hawaii.....	9,968	269,649
East Indies.....	1,363	48,028
All other countries.....	9,277	276,378
Totals.....	\$2,260,139	\$67,245,243

"For 1896 the total exports were \$3,051,168, a gain of \$791,039 over the preceding year. There was an increase in the sales to the United Kingdom, British Australasia, Africa, Germany, France and some South American countries, and a slight falling off in the number of sewing machines sold to Canada.

The figures relating to France include only the sewing machine heads, as under the high retaliatory duty enforced in France against American products it is not found profitable to export the iron stands and wooden cabinets. For February, 1897, the total value of the machines exported was \$244,796. Cuba, which in 1895 took \$16,114 worth of sewing machines, in 1896 fell off to \$3,661, and this was mostly for attachments, needles, etc. The unhappy Queen of the Antilles, wrapped in the horrors of war, has had little use for anything but food, firearms and ammunition.

"The annual average of sewing machine exports during the last ten years has been over \$2,500,000 in value. This does not include the 200,000 made annually in the Scotch factory, which operates with 4,000 employees at Elizabethport, N. J., and a curious confirmation of the vaunted supremacy of American over foreign labor is found in the fact that the 4,000 Yankees in New Jersey turn out as many machines as do the 6,000 Scotchmen in Killbowle. Of the total of 13,500,000 machines made by this company from 1853 to the end of 1896, nearly 6,000,000 have been made in factories located abroad, but directly controlled and managed by the New York company. The average value of the exports of sewing machines from the United States indicates that about 150,000 machines are exported annually, and the total number of American machines sold annually in foreign countries, including those made abroad, is equal to the sales in the United States by all the American companies.

## EXPORT TRADE A GREAT FACTOR.

"The export trade has been the salvation of the sewing machine industry in the United States," said the president of one of the leading companies. "During the financial depression of the last four years there has been a marked decrease in domestic sales, and sharp competition has affected prices unfavorably. There has been cutting of prices in all directions, and some of the biggest companies have taken a hand in it. The sale of sewing machines at cut prices by the large department stores has had a demoralizing effect, and it is not to be denied that some very excellent machines are being marketed in this way at low figures. So far the big standard companies have kept their machines out of the department stores, but they would have found it difficult to keep their factories running on full time if it had not been for the export demand."

"There have been great fortunes made and great fortunes missed in the sewing machine industry. Elias Howe realized over \$1,000,000 in royalties and license fees for his inventions and improvements, and Isaac M. Singer lived to see the business of which he was the founder develop into colossal proportions from the investment of \$40 and no end of patience, perseverance and skill. Other men have grown rich in the business, and from its development and operation vast additions have been made to the wealth and prosperity of the country. Howe and Singer seem to have been the only ones among the earliest inventors who reaped substantial rewards. The others lacked the faith and persistence to perfect and utilize their ideas, and so missed their great chances in life."

## Anti-Friction Top Roll.

A TOP roll for spinning frames, drawing frames, mules and speeders, equipped with anti-friction bearings and designed to run without lubricating oil, was patented recently by Leon W. Campbell, of Woonsocket. The inventor states that one of the disadvantages resulting from bearings for which lubricating oil is a necessity is that the oil creeps on the leather or rubber of the rolls, and injures them, besides causing the cotton or yarn to adhere to their peripheries. It is said to be impossible to always revolve rolls requiring the use of lubricating oils evenly and without dressing, as there are times when the operative neglects to lubricate the bearings, and since the top roll is not positively driven, its stoppage, even though it may be minute, is injurious and a detriment to the production of perfect yarn.

The main arbor of bearing, upon which the pressure of the holding down weights is applied through the saddles, has an enlarged central portion, a reduced spindle projecting from each end, each spindle being connected with the central part by a concavo-conical bevel surface. Each of the spindles is threaded to receive a concavo conical nut, which may be adjusted along the spindle and secured in any position by a lock nut.

The nut and the concavo-conical part of the arbor furnish cone bearings for the anti-friction balls which are held between them and the sleeve, the latter being counterbored at each end to provide an internal bevel surface. By adjusting the conical nut any wear may be compensated for and the sleeve may be kept running smoothly and evenly.

Upon the sleeve is placed a shell held on temporarily by a spring ring. The periphery of the shell may be covered with leather, rubber, or other material to form frictional cushioning surfaces for the yarn.

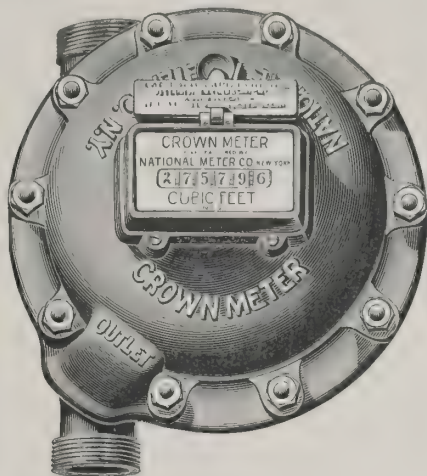
After the sleeve has once been adjusted and secured in place, it is unnecessary to move the nut except to take up wear, and there is therefore no chance for the anti-friction balls to be removed or lost, since the shell may be easily removed and another one inserted without any delay and without requiring the removal of the sleeve or even requiring any parts to be adjusted.

—The Berlin Iron Bridge Company, of East Berlin, has the contract for furnishing for the Government of Limon, Costa Rica, a market building constructed entirely of steel. The framework of the building will be of light skeleton steel work and the roof covering will be of galvanized iron with ornamental cresting and cornices. Completely surrounding the building will be placed an ornamental iron fence provided with large entrance gates. The gate posts will be surmounted by elegant wrought-iron lamps. The whole design of the market is neat and attractive in every way.



Interesting Information for Water Works Officials about

# WATER



# METERS

They measure correctly the amount of water passing through a pipe.

**They increase the revenue,  
Restrict the waste,**

and assist in maintaining a uniform pressure in the water main.



We have many letters of similar character, copies of which we would be pleased to mail you.

## NATIONAL METER CO.

298 BROADWAY, NEW YORK.

**The Largest Water Meter Manufacturers in the World.  
Over 179,000 in Service.**

[MAY, 1897]

City of Highland Park, Illinois.

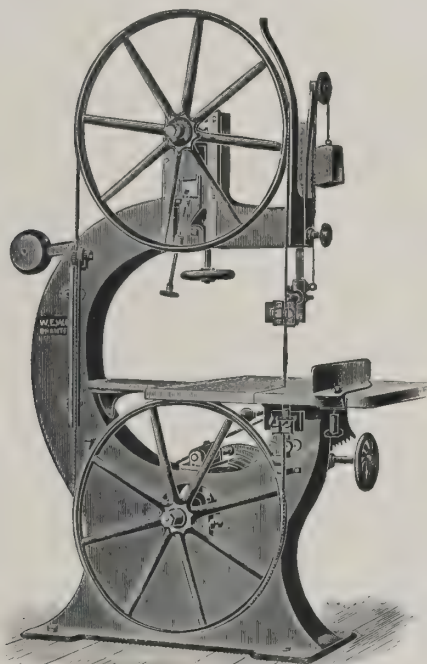
NATIONAL METER CO.,  
298 Broadway, New York.

GENTLEMEN:

Replying to your favor of the 3d inst., would say that the city of Highland Park adopted the meter system in their water works in the winter of 1894-95. The result has been a material increase in revenue from the system, and a decrease in pumpage of at least 40 per cent. The water takers are well pleased with the service, as each pays for what he actually consumes. The city derives another advantage from the fact that leakage is quickly discovered, thereby increasing the economy of operating the system. Our experience has fully satisfied the most skeptical that meters soon pay for themselves in increased revenues on the one hand, and reduced cost of operating on the other.

Yours very truly,

J. C. CUSHMAN.  
Chairman of Water Committee.



No. 3.—36-inch Wheel. Weight, 2,000 lbs.

### BAND RE-SAWS.

No. 5 Band Resaw.—48-inch wheels; saws 24 inches wide, 5 to 40 feet per minute. Resaw swings clear of machine when required. Weight, 4,500 lbs.

No. 6 Band Resaw.—48-inch wheels; takes saws to 3 inches; cuts 30 inches deep. Weight, 4,300 lbs.

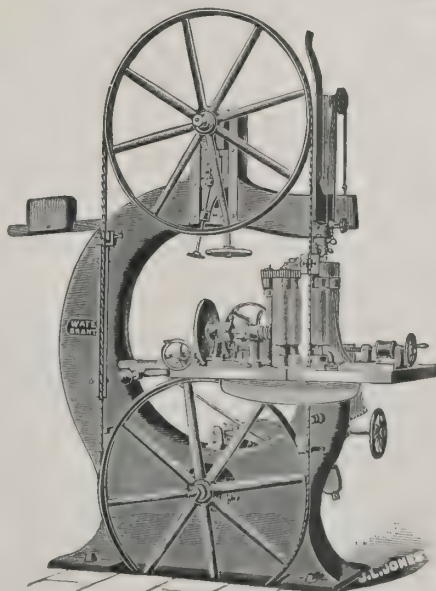
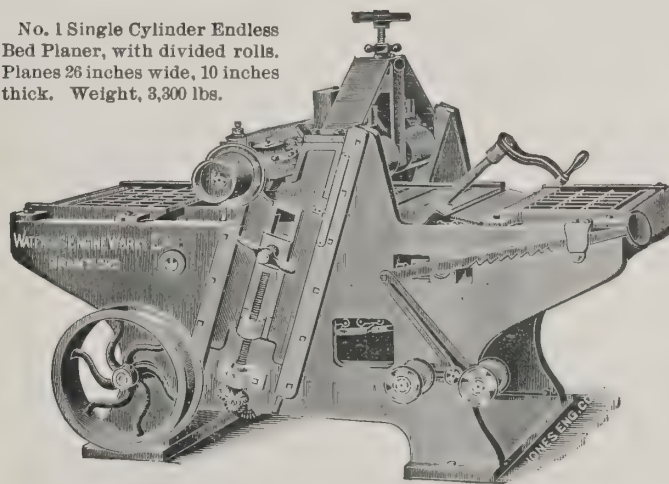
No. 7 Band Resaw.—54-inch wheels; 4-inch saws; cuts 30 inches deep and to center of 10 inches. Weight, 5,300 lbs.

OTHER SIZES MANUFACTURED.

FULL LINE OF

**Saw Mill Machinery.**

No. 1 Single Cylinder Endless Bed Planer, with divided rolls. Planes 26 inches wide, 10 inches thick. Weight, 3,300 lbs.



No. 4.—40-inch Wheels and Removable Resaw. Weight 2,750 lbs.

## Wood-Working MACHINERY.

No. 1 E. B. Planer. Weight, 3,300 lbs.; like cut.  
No. 1 Double Cylinder E. B. Planer. Weight, 5,300 lbs.  
No. 2 E. B. Planer. Weight, 2,600 lbs.  
"Champion" Combined Planer, Matcher and Moulder.  
Planes 24 inches wide up to 6 inches thick. Best all-around machine.

MANY OTHER STYLES AND SIZES,  
AND FULL LINE OF  
WOOD-WORKING MACHINES.

Long experience in the export trade is  
a satisfactory guarantee.



1844.

NEW  
PREMISES.

1896.

January, 1896, we moved into new premises, securing unsurpassed facilities for executing contracts promptly and satisfactorily. Order direct or through your commission house, sending us copy of order.

**Saw Mill Machinery Our Specialty.**

There are some 300 of our saw mills running in South and Central America, Europe, Asia and Africa, of different sizes, from those cutting logs 6 feet in diameter to small mills sufficiently portable for mule-back transport.

# WATEROUS, BRANTFORD,

CANADA.



### A Pump Worked by the Current.

LACK of water is the great difficulty under which the almost inexhaustible agricultural lands of the West labor. To obviate this, new schemes are daily being devised, some of which have already turned deserts into blooming gardens. Many of the mining territories, too, have to contend with the same lack, so that both miners, particularly placer miners, and agriculturalists will hail with joy the invention which has been perfected by a Montana man.

This is known as the "current pump," and its purpose is to raise water over river banks. It is now being tested and successfully operated in the State of Montana.

The "current pump" promises to revolutionize the placer mining and agricultural industries of many portions of the Northwest. This device is the invention of Louis E. Miller, of Montana, and has been designed by him to supply the lands along streams whose banks rise so abruptly and to such heights as to render impracticable all efforts hitherto made to use the water for irrigation or for placer mining, writes a Helena correspondent of the *Chicago Record*.

Banks along the rivers and streams of the West rise sharply, often nearly perpendicular, ranging all the way from 20 to 100 feet. The land immediately bordering these streams frequently contains a large amount of mineral wealth in the shape of placer gold, while, perhaps, a little further back upon the banks are lands that with irrigation would become valuable for agricultural purposes, but the enormous expense involved in getting the requisite quantity of water for sluice mining or for irrigation would leave little margin for the investor. With the aid of this recent invention, however, thousands of acres of land now lying idle may be rendered valuable.

The principal features of the new pump are its simplicity of construction and operation, and its wonderful adaptation to the work for which it is designed. It is simple and compact, and can be easily carried from place to place; it requires no preparatory construction work in the way of anchorage and needs no power to operate it other than the force of the current of the river or stream in which it is placed. Placed in a stream of water and depending alone upon the current for power, it will pump 1,000 gallons of water an hour in a five-mile current—the quantity of water increasing as the current increases—and will raise this amount of water to an elevation varying from 75 to 100 feet, in proportion to the rapidity of the current.

The mechanism of this invention is described as operating on the inside of a galvanized casing, conical in form and having screws somewhat resembling the propellers on a steamboat. This casing turns upon a hollow axle, the latter having a closure between the inlets to the diaphragm chamber and serving the twofold purpose of an axle and inlets to the pumping mechanism. The action of the current upon the propeller like screws attached to the casing causes the case to revolve upon the hollow axle, while on the inside of the case, and attached to it, is a cam, which by means of connections converts the rotary to a reciprocating motion, thus operating the pump. The pump proper consists of two concave disks, in the shape of saucers, attached to the hollow axle, and a crosshead, free to move or slide on the hollow axle, with convex disks, which fit into the concave disks attached to the axle, on or near the centre of the movable disks, while to the outside edge of the immovable disks are fastened heavy hydraulic canvas diaphragms. The rotary motion of the case, through the medium of the cam, a rocker-shaft and connecting links, imparts to the crosshead and the disks attached thereto a reciprocating motion that causes the movable disks to seat or close into the fixed disks, thus alternately filling and discharging each chamber and causing a constant flow. The inlet and discharge valves are attached to the hollow axle at each end. The pump is anchored in the stream by means of a crossarm and guy lines, running either to the shores or to piles driven in the bed of the stream.

It is asserted by those familiar with the lands in Montana, Idaho and other Northwestern States lying along such rivers as the Missouri, Snake and Columbia that they are almost without exception rich in placer gold, and would yield immense profits could they be worked at a moderate expense. Owing to the nature of the banks, however, it has been impossible to work these lands without involving such enormous expenditures in the construction of ditches, flumes and reservoirs as to absorb all the profits resulting from mining. The same truth holds in regard to irrigation. Now, with this simple but effective device, it is asserted that placer grounds may be operated and fertile agricultural lands cultivated at a minimum expense.

A LEADING iron and steel firm interested in the iron export trade to Europe has received a letter from a Tennessee company concerning its export business. The letter says in part: "I sent an agent to England and the Continent of Europe in July last with instructions to visit the various market centres and ascertain and report the quantity and quality of iron used in the various districts, with a view to introducing our iron to foreign manufacturers. We began at once to make efforts for sales and have succeeded in reaching most of the important foreign markets. Our sales abroad have reached between 60,000 and 70,000 tons. The prices obtained have been fully as good in all cases, and in many better, than the equivalent of our domestic sales. The changed conditions which enable our company to export a large percentage of its product instead of sending it almost entirely to the Northwest give us an outlet and a market the importance and value of which it is difficult to estimate, and which we can never be deprived of on account of our lower cost of production and closer proximity to tide water, enabling us to deliver iron on board ship at Gulf or South Atlantic ports at a much less price than can be done by any other iron district in the United States. Our basic iron, we have been able to market in Italy and Germany."

### Pig Iron Exports.

THE movement of pig iron for export from the Birmingham region has assumed large proportions. During the month of January more than half the iron shipped from that region went across the Atlantic. This movement in its infancy was regarded as spasmodic, and the idea that it might become a matter of permanent importance was ridiculed by iron men, but instead of ceasing or becoming intermittent, the export traffic in pig iron has grown steadily and now constitutes 55 per cent. of the Alabama shipments. The price realized nets the iron companies \$8 to \$8.50 at the furnace for No. 1 foundry iron. This yields a small profit, which, though not so large as the furnaces made in good times, is sufficient to keep them running and keep them seeking orders abroad. A railroad official said:

"The export business is booming. The Southern Railway took about 14,000 tons of iron for export during January. This was 55 per cent. of the shipments made by that line. The Louisville and Nashville takes rather more, and the two lines took out of the Birmingham region for export during January about 30,000 tons of pig iron. The business is steadily growing, and a leading furnace man told me this week that the volume of the export business was limited by the amount of room to be had in vessels in Southern ports."

For some time the total exports at Southern ports have been increasing and the new business in pig iron exported and Western business brought to Charleston by the Louisville and Nashville will swell the totals this year. Railroad men are taking a deep interest in this new export business and are encouraging it by very low rates to the ports. They say it has been demonstrated that there is a point below which domestic prices cannot go, as the export business is possible before the prices go down to the cost of production.

### An Alleged New Steel.

THE daily press has reported the discovery by Samuel Maxim, a brother of Hiram Maxim, the well-known inventor, of a new steel, said to possess remarkable properties. These are thus described by a correspondent of the *Philadelphia Record*, as abstracted in *The Engineering Magazine*:

"Mr. Maxim has an experimental laboratory at Wayne, Me., and there, it is claimed, he has discovered a process of making steel which he believes identical with the steel of ancient India, alleged to have been far superior in quality to any steel known to modern mechanicians and metallurgists, until its rediscovery at Wayne. It is further alleged that the brothers Maxim are now fitting up a laboratory and manufactory in London for the commercial production of this remarkable metal. For armor-plating it is claimed that the new steel can be made to resist any projectile now known, even when thrown by the highest explosives, and when the plating is thinner and lighter than that now employed.

"But that which—if it prove to be well founded—will be of most interest to readers of this department, is the asserted tool-making value of the new steel. 'Chisels and drills made from common iron into steel through the process discovered by Mr. Maxim have been submitted to the most celebrated steelmakers of London, who have pronounced them the most wonderful products of modern times. Several drills made from Maxim steel have been found to withstand marvellous tests. With these tools the best steel known has been drilled and the drills have not been marred in the least. A small knife blade made from the Maxim steel possesses the wonderful power of cutting glass with as much ease as if the glass were chalk.'"

### Steel Bridges for Japan.

NO little significance is attached by the iron trade to the fact that the Japanese Government has just awarded to a Philadelphia firm the contract for 2,000 tons of structural bridge steel, to be delivered in the form of 186 steel spans of varying length for the Imperial Japanese Railway. The cash value is about \$75,000, but the importance of the contract lies not so much in its magnitude as in the fact that it is the first contract for structural steel ever secured by an American firm from the Japanese Government, and, so far as known, the first from the Japanese nation. It is taken as demonstrating the ability of American manufacturers to secure such work owing entirely to their improved facilities and the reduced cost of the material.

The contract calls for the completion of the work in 1897, and the firm will begin it the moment the detailed plans shall be put in their possession. There will probably be four or five shipments of the material. The securing of this contract is looked upon as an entering wedge for American manufacturers of structural steel and iron in the markets of Europe, and it is expected that it will be followed in time by other contracts of greater magnitude and importance.

—Many Swedish pulp mills are purchasing American machinery. In a new pulp mill soon to be erected at Vermland five American grinders will be installed. A new company has been chartered to run a mill for the conversion of wood, and as the Scandinavian pulp industry has of late been waning, the most improved appliances of American make will be used to obviate local difficulties as much as possible.

—Michael J. Dady, of Brooklyn, N. Y., has secured an important contract to improve the sanitary condition of Havana. It is said that the contract will involve an expenditure of about \$15,000,000. Work will be begun next Winter, and it will give employment to from 4,000 to 5,000 men on sewers, pavings, etc. All the preliminaries of the agreement have been decided upon, and it is reported that Mr. Dady has as security bonds issued by the city of Havana to the amount of \$12,000,000.





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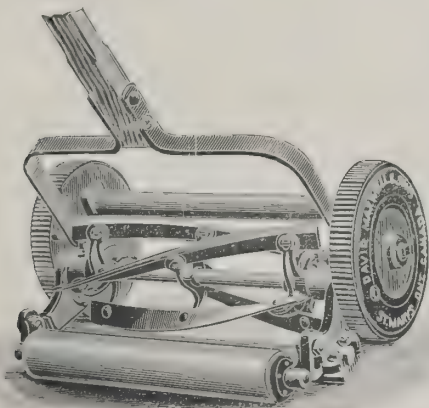
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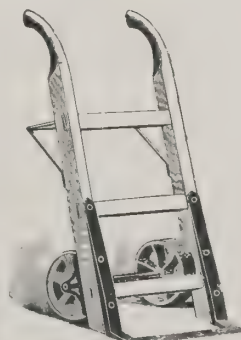
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### Steel Made from Pig Iron.

A VERY important discovery which will revolutionize the steel industry in the United States, if not in the world, was tested in Bellaire, O., before a committee composed of the leading iron and steel workers and experts of the country, says the correspondent of the St. Louis *Globe-Democrat*. Test made steel was made from common pig iron and pig scrap, treated by what is known as the Hastings new process, converting iron into steel, and cast into sand molds. Four years ago John B. Hastings solved the problem and to-day the Bellaire Edge Tool Casting Company is manufacturing tools out of iron treated by this process with wonderful success. It expects to place upon the markets of the world all articles made from high grade steel. Tools upon which tests were made by the committee were made from the cheapest pig iron and old scrap. The process for treating this iron is very simple, but its effects are very great, as is clearly shown. The iron is taken in a ladle from the cupola, run into sand molds and then tempered to a degree of hardness as the case may require for usage. By this process the steel is positively anti friction, which fact alone is one of much importance to the great railroad systems of the country. It means a saving of many thousands of dollars to them merely in the manufacture of journals, brake shoes, tools, etc., as they can be made at much less expense, while their durability is far greater than those now in use. One great feature of this process of treating the iron is uniformity in temper no matter how great or how small the cast may be.

### Growing Use of Ductile Iron.

THE growing introduction of ductile iron is pointed out by a writer in *Engineering* as an important feature in the mechanical world. Its tensile strength is represented to be 63,000 pounds and more to the square inch, and, after being heated to a dull red and plunged into cold water, it can be filed easily, showing that it takes no temper. Specimens are mentioned which have had portions heated and drawn out under the hammer after being twisted cold, without fracture, and, in another case, a heavy chain, the links of which were cast open, then joined and welded without the use of flux; also valve stems, crank shafts, and other similar pieces, finished to pattern in a lathe and exhibiting surfaces without a blowhole; intricate castings, too, being reproduced regularly without failure, while, as is well known, a not inconsiderable percentage of losses has attended other methods for the production of very strong castings.

### A New Engine.

PETER HERSEL and James Buttrell, St. Louis, have perfected an engine that seems a wonder in its way and will no doubt overcome many of the difficulties heretofore encountered in securing light motive power for various uses. A brief description is given, as follows: The wonderful part of this engine is that it does away entirely with the connecting rod and has no back pressure in the steam chest. The pressure works direct from the piston on to the fly wheels, and there is therefore no loss in the exhaust. The cylinder is only a 5 inch bore and the stroke is but 4 inches, but the double cylinder pressure from the centre creates a vacuum which forces the piston back by atmospheric pressure. The inventor claims that he can make a similar engine which will weigh only 100 pounds, and yet be capable of producing 15 horsepower with less than 40 pounds of steam.

### Our Iron Cheap and Popular.

OWING to the dissolution of the steel trust, and the tremendous reduction in the price of the product consequent thereon, foreign orders have been placed with our manufacturers to the amount of at least 100,000 tons. Within the last four years exports of iron and steel have increased 50 per cent. For the fiscal year ended June 30, 1896, they amounted to \$41,160,877. It is since then, however, that the increase has been really phenomenal, for during the last six months of 1896 the increase in the exports of pig iron over the corresponding period of the preceding year was more than 200 per cent. It is expected that during the present year the exports will be between \$50,000,000 and \$100,000,000 in value. The bulk of the exports has been from the South, in certain parts of which pig iron can be produced more cheaply than anywhere else in the world.

### A \$400,000 Contract.

THE CARNEGIE STEEL COMPANY, Pittsburg, Pa., has received an order for 18,000 tons of steel, which will be used in the construction of an immense new bridge, designed to replace the famous Victoria tubular bridge at Montreal, Canada. The Victoria tubular bridge is one of the largest in the world, being 7,000 feet in length. It is supported by about twenty piers. Whether the new bridge is to be of the tubular construction or not is not stated, but it is likely that the steel to be used in its construction will be structural steel.

The old bridge cost over \$5,000,000. It contained 10,500 tons of iron and 3,000,000 cubic feet of masonry. It is nearly forty years old and has probably shown signs of weakness, although this is not stated.

—The Mexican Central has awarded a contract to build 325 box, 150 coal and 75 stock cars to the Michigan Peninsular Car Company. The same works are building 150 flat cars for the Northern Pacific.

### American Manufactures at Brussels Exhibition.

THE exhibit of American machinery at the Brussels Exposition does not promise to be a very large one, wherein it will not differ from previous European exhibitions. Some of the leading exhibits of American goods will be a comprehensive collection of agricultural machinery and of windmills. Windmills are of such common use in Belgium, and the American mills differ so radically from those used by the Belgians, that it is anticipated the exhibit will attract a great amount of attention. It is understood that cash registers and household furniture will also be exhibited in a creditable manner.

This exhibition returns to the old practice of giving money prizes, a \$5,000 capital prize being offered for the exhibit showing the greatest special importance and utility.

### Refining Copper.

A REVOLUTION has been quietly effected in the methods of refining copper, and nearly half of that produced in this country is now refined by electricity. The method consists in electroplating the metal from an anode composed of the "blister" or impure copper, the strength of the current and the composition of the liquid being so chosen that nothing but copper is deposited upon the cathode, the impurities in the crude metal falling to the bottom of the tank in the form of mud. The great electrolytic refinery of the Anaconda Company, in Montana, produces from 100 to 120 tons of refined copper daily by this process, and is the largest plant of the kind in the world. A similar refinery at Perth Amboy, N. J., has a capacity of 10,000 tons of refined metal per annum.

### A Floating Sawmill.

A SAWMILL which can be floated from one place to another, and in which the power is furnished by electricity, is in operation on the American River, at Folsom, Cal. It is the first sawmill in the world to be run entirely by directly transmitted electric power.

The logs are conveyed from a distance of about ten miles by rail to a point about 1,300 feet above the level of the river, to which they are shot down by a chute 3,000 feet long. Here they bring up in an artificially constructed pool, from which they are floated down to Folsom, a distance of about forty miles.

### Notes of Interest.

—C. E. James & Co., Chattanooga, Tenn., have just shipped a machinery equipment for a hydraulic gold-mining plant to Dutch Guinea, South America, amounting to about seventy tons, including engines, boilers, pumps and crushing machinery.

—Señor Victor M. Brascini, a Mexican industrial promoter, has closed a contract with the Holly Manufacturing Company, Lockport, N. Y., for a 19,000,000-gallon pumping engine for the city of Mexico. This engine will be used in pumping the sewerage of the city and will be part of an elaborate system based on the plan in use in Berlin, Germany.

—The Michigan Lubricator Company, of Detroit, Mich., U. S. A., have recently issued a handsomely illustrated catalogue showing in perfect detail the various devices of the manufacture of its product. This catalogue will be mailed, free of charge, to any address on application. It is a volume which every dealer in or user of the devices it illustrates will do well to place in his office library as a useful book of reference.

—Standing in the erecting shop of the Baldwin Locomotive Works, nearly completed and ready for shipment, are twelve locomotives, which constitute the first contract or order of any magnitude ever received by an American manufacturing firm from the Chinese Government for locomotives. This contract is of special significance in view of the fact that it was secured by the Baldwins in competition with twenty of the locomotive manufacturing concerns of the world and in that it has opened up a field for American engines heretofore practically inaccessible. It is of special interest to Philadelphia in that it is still another recognition from abroad of the ability of its manufacturers to cope with those of the world.

AN order was placed recently by an export firm identified with French trade for two unusually powerful band mills, together with other woodworking machinery. The value of the transaction is given at \$4,200. The machinery will be shipped to Havre as soon as ready. It is believed, however, that this machinery is intended for a South American plant, where the requisitions call for certain large pieces to be of a particular American make. Both Chili and the Argentine are at present, it is said, putting up large works in which such machinery is to be used in both countries. European capital is backing the enterprise.

CERTAINLY one of the triumphs of modern engineering is the canal being built for the purpose of carrying the vast amount of sewage of Chicago into the Mississippi River, the main design being that the waters of Lake Michigan shall flow through them at the rate of 10,000 cubic feet per second, the intention being to have the sewage so diluted that no possible harm can occur to the towns by which it will flow. Among the most striking data of this immense work is that of its length, viz., 28 miles. Where it passes through alluvial ground the width at the bottom is 202 feet. The total excavation will amount to nearly 40,000,000 cubic yards, 12,000,000 of which is solid rock.





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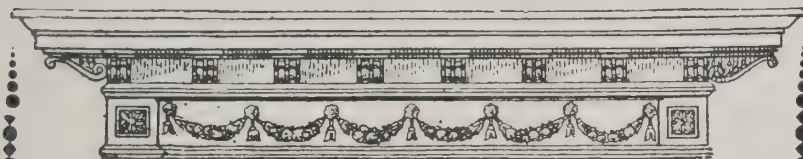
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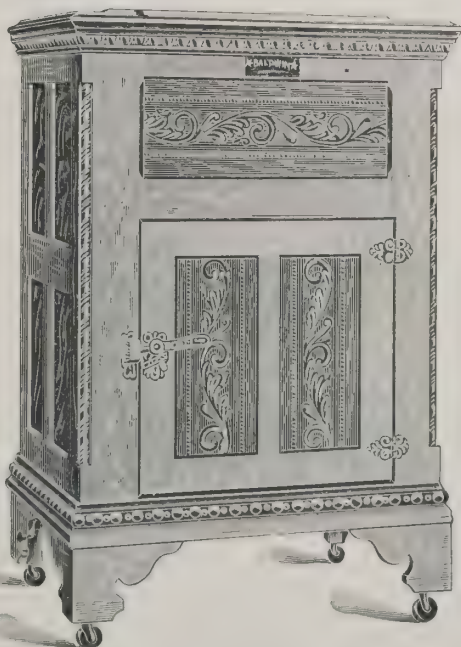
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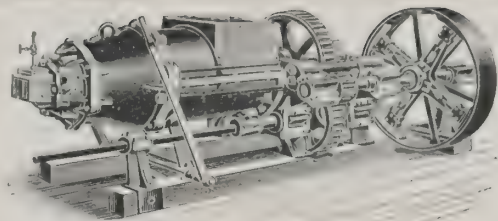
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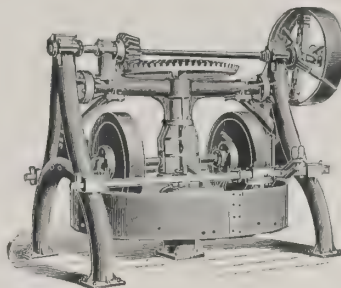


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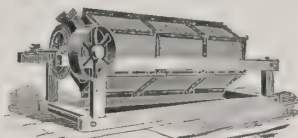


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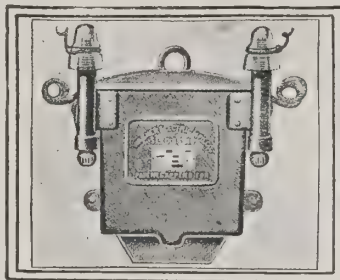


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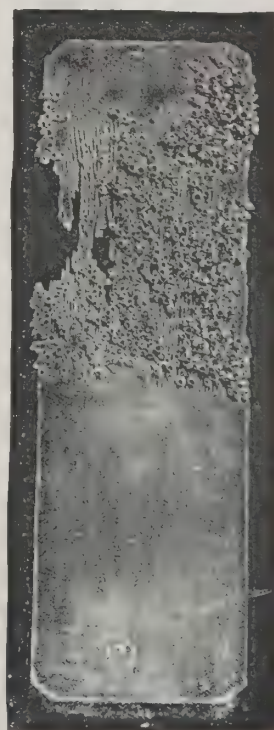
U. S. A.

### REMARKABLE FACT.

This cut is a copy of a photograph of a board having one end painted with New Jersey Copper Paint, manufactured by Harry Louderbough, proprietor of New Jersey PAINT WORKS, Jersey City, N. J., U. S. A., and placed in the water at Port Royal, S. C., for five months. Upon the unpainted end you can note the ravages of the salt-water worm so destructive to wood, and also the large number of barnacles that have fastened upon it. Observe the painted end, where New Jersey Copper Paint was applied—its splendid condition.

The board here represented was placed in the water at Port Royal, S. C., by me, and left in the water five months. The painted end was as good as when it was placed in the water.

MILLS EDWARD,  
Master Schooner "Florence Shya."





### Three Thousand Words a Minute.

A VERY interesting paper was read before the American Society of Mechanical Engineers, at 12 West Thirty-first street, by Prof. Albert Cushing Crehore, of Dartmouth College, describing a new method of very rapid telegraphing by the use of alternating currents, which has been developed by Prof. Crehore and Lieut. George Owen Squier, of the United States Army. The experiments which resulted in the development of the new system were carried on at the United States Artillery School at Fort Monroe, Va., where a considerable length of telegraph and telephone wires was available for the purpose. The lecture was illustrated by lantern slides.

The paper was extremely technical, as was necessary in explaining the principles involved and the means by which these may be utilized, but the results which it is said may be accomplished by the new system are astonishing. An ordinary telegraph operator, sending messages by the Morse system, can transmit from thirty to forty words in a minute. By the Wheatstone system, where the messages are first prepared on a punched strip of paper, and then transmitted automatically, a speed is attained of 150 to 200 words a minute. By the system described by Prof. Crehore it is promised that a speed of 3,000 words a minute may be attained over a single wire, and at the same time the wire could be used for sending other messages by the ordinary Morse system or by the quadruple system without creating any interference. It is also possible to send two entirely different messages over the same line at one time at the rate of 3,000 words a minute, and in addition to this the messages could be transmitted to and received at any number of stations at the same instant and recorded automatically.

Like other automatic systems, it would be necessary to have the messages prepared for sending on slips or sheets of paper, punched with the proper signals to represent letters in accordance with the European modification of the Morse code. The general method by which this wonderful speed is to be accomplished is by taking advantage of the peculiarity of the alternating current, in which currents of opposite polarity succeed each other with a rapidity varying in different dynamos from about 250 to 400 a second. Between each pair of these waves of current is a moment when the wire is neutral. By means of a simple device, which was described, these currents may be interrupted at fixed intervals, and one or more wave movements of current omitted. By noting these interruptions and their order the messages can be read.

Of course this could not be done by means of the eye or by any mechanical apparatus in which any material thing had to move, and one of the most interesting parts of the new system is that of receiving the messages. Two methods have been tried successfully for this purpose. One depends upon the principle that light, polarized by being passed through a prism, may be turned from its direction by passing it through a coil of wire through which an electric current is passing. A powerful ray of light is first passed into two prisms in such a way that none of it gets through. Between the prisms is placed a glass tube containing a uphide of carbon. Around this is the coil of wire which carries the current. Whenever a current passes the light is deflected one way or another so that some of it gets through the two prisms and falls upon a moving sensitized paper and makes a dot.

The other proposed receiver is a chemical one, where needles press upon a moving paper properly prepared and leave a mark whenever a current passes through them. A needle can be used for each of the currents sent out—the direct current and the reversed one—and so two records made side by side at the same time. It is by the use of devices of this kind placed in as many receiving offices as might be desired that any number of duplicate messages could be received at once.

The possibilities of such a system are vast. One of those suggested by Prof. Crehore is that a few telegraph wires might transmit all of the more important business now conducted by mail. Typewriters, he said, could be fitted with automatic devices for punching the characters of the code at the same moment that the operator was writing his ordinary letterpress copy, and these perforated papers would be sent to the telegraph office to be forwarded. Forty thousand letters are carried daily between Chicago and New York. Prof. Crehore said it would take but two wires, worked by the new system, to transmit this entire correspondence and make it possible for a person to send his letter and get a reply in the same day, allowing for the time of delivery. Typewriters and stenographers, he added, would have to learn to read the telegraph code in addition to their present accomplishments.—*New York Sun.*

### Did Both Good.

IT was remarked that the successful war waged by Japan against China had brought in its train a remarkable quickening of the economic energies of the people of the Mikado's empire. The same is said to be the case as regards China, as one of the results of her defeat at the hands of Japan. The Celestial Empire, too, seems to have had a stimulus applied to it of a kind to which it has long been a stranger. Consul Read, at Tien-Tsin, gives an account in a report just received at the State Department of the work being done at Tongshan, eighty miles from Tien-Tsin, where extensive car works have been established, and where the rolling stock for the Tien-Tsin extension is being built. The point of interest for Americans which is brought out in the report is that, owing to the economic and industrial development which is going on in China, American manufacturers may find it to their interest to send over catalogues and price lists. This hint is especially commended to makers of railroad appliances, planing, sawmill and mining machinery and fire engines. Apparently there is some prospect of an economic exploitation of the far East.—*Bradstreet's.*

### Our Slate Output Large.

PENNSYLVANIA is still far in the lead in the production of slate in the United States, with Vermont coming next, according to the statistics for 1896 published by the United States Geological Survey. The following table shows the output and value of slate in the different productive States during the calendar year 1896:

State.	Roofing Slate—		* Value.	Total.
	Squares.	Value.		
Georgia .....	4,597	\$20,388	.....	\$20,388
Maine .....	23,078	99,831	\$24,255	124,086
Maryland .....	15,557	70,194	1,948	72,142
Massachusetts .....	.....	.....	1,200	1,200
New Jersey .....	200	700	.....	700
New York .....	16,002	78,612	3,880	82,492
Pennsylvania .....	431,324	1,391,539	334,779	1,726,318
Tennessee .....	160	640	780	1,420
Vermont .....	155,523	509,681	99,915	609,596
Virginia .....	26,863	92,163	15,700	107,863
Totals .....	673,304	\$2,263,748	\$482,457	\$2,746,205

\* Value for other purposes than roofing.

Mr. William C. Day, who is in charge of stone statistics in the Division of Mineral Resources, of which Dr. David T. Day is chief, commenting upon these figures, says:

"The value of the slate output in the United States was \$2,746,205 in 1896, an increase of \$47,505 as compared with the value for 1895. The past year has been unprecedented in the history of slate quarrying, by reason of the rapid advance in the export trade. Strikes, resulting in suspension of operations and consequent inability to fill orders at the quarries in Wales, have brought about a demand for United States slate in a number of foreign countries. Foreign buyers of slate have appeared in our markets, while agents of domestic producers have gone abroad to solicit orders. Domestic sales of slate were more curtailed by financial depression than in 1895, so that had it not been for the increased exportation, production would have run considerably behind the preceding year, whereas it is somewhat more. Pennsylvania was probably benefited to a greater extent by the increased exportation than any other State, although Vermont came in for no small share.

"Tennessee makes its first appearance as a slate producing State with fair indications of steady growth in this direction as the result of quarrying and milling operations recently inaugurated in Blount County. Some 200 squares of roofing slate from a source in Carlton County, Minn., have been applied to roofs with the view of giving the material from this new source a practical trial. Quarrying operations will probably be undertaken in the near future.

"The production of milled slate somewhat exceeded that of 1895. This is, partially at least, accounted for by increased exportation of blackboards. It seems to be generally conceded that American slate has made a favorable impression abroad and it is to be hoped that the trade which has been gained as the result of temporary exigencies may be permanently retained by virtue of the excellence of our slate and the enterprise and business sagacity of its producers.

"Not a little of the material sent to England was reshipped to Australia and South America."

### American Enterprise in Mexico.

THE commercial relationships of the United States and Mexico, says the *Age of Steel*, are of a friendly and encouraging character. Under these conditions there is seemingly nothing to hinder an increase and perpetuity of this congenial intimacy. For the contiguity of the two countries we have a natural reason for this commercial friendship. In the proximity of markets we have a factor in the economics of transportation that is essentially vital to trade. This is not to be annulled by any difference in flag or politics, commerce being a matter of dollars and not exclusively of sentiment. In the interchange of products by both land and sea the advantages both to Mexico and the United States are self-evident. These are being continuously multiplied and extended. In railroad enterprise this has been markedly shown in the addition of new lines during the last six months and in the construction and projection of others. These lines are designed not only to facilitate trade already established, but to open up and develop business in territory otherwise unavailable and isolated. Resources hitherto out of reach and industries dormant for lack of enterprise and opportunity, with the apathy and stagnation consequent thereto, are, or will eventually be, in responsive touch to the coming era of activity. As American enterprise deploys along these lines the commercial union and opportunities of both nations must necessarily deepen and broaden. As betokening the good feeling of the Mexican Government in regard to the extension of trade with the United States, President Diaz, in his recent message to Congress, announced the granting of franchises for the establishment of four new steamship lines between Mexican and American ports. This action has a significance not to be misunderstood. It means amity, enterprise and progress, and possibly the building up of a Mexican merchant marine. In the matter of European competition for Mexican trade, it is not likely to be so successful or aggressive as with other Spanish-American countries. Neither Great Britain nor Germany has the traditional commercial prestige in Mexico they enjoy in the lower latitudes. The imports from Great Britain for the fiscal year 1895-1896 was but \$8,000,000, as against \$20,000,000 for the same year for the United States, while the Mexican exports to the United States more than quadrupled those to Great Britain, rising up to the total of \$80,000,000. With these facts in evidence, it would seem to be beyond cavil that as a field for American enterprise, Mexico has advantages and opportunities it would be idle to deny and foolish to neglect.



American shoemakers and shoe-menders have got ahead of you. They don't buy whole sides or sole-leather now.

A shoemaker wants 2 or 3 grades and 4 or 5 thicknesses.

We cut sides, make 8 grades and 15 thicknesses, sell the cobbler the grades he wants, and the rest, including the waste, to somebody else, who wants that.

Prices depend upon thickness and quality.

All well served; no waste; no using leather because you've got it.

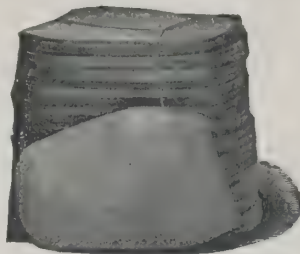
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Sample dozens may be ordered of any export house

**BAXTER SCHENKELBERGER & CO.,**

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### MEN'S HALF SOLES.

Quality.	Thickness.	Hemlock.	Oak.
Prime	6 inch	2.99	2.30
	5 1/2	1.80	2.10
	5	1.62	1.80
Good	6	2.04	2.14
	5 1/2	1.84	2.02
	5	1.65	1.74
Medium	6	1.48	1.54
	5 1/2	1.80	1.94
	5	1.68	1.80
	4 1/2	1.50	1.62
Coarse	6	1.32	1.38
	5 1/2	1.42	1.50
	5	1.32	1.38
	4 1/2	1.20	1.26
	4	1.08	1.14
	3 1/2	.98	1.02

## Do You Smoke a Pipe?



Our **DIAMOND Steel Combination Pipe Cleaner and Cigar Cutter** will make your old pipe **Sweet and Clean in One Minute.** It will also clip the end off your cigar in one second and make you happy. Beautifully nicked. Price, 15 cents. Will sell everywhere. Ask for the agency quick.

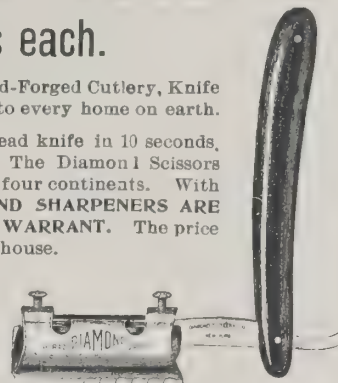
## 1,000,000 Diamond Safety Razors at 25 Cents each.

One for every man who shaves himself. Just to introduce our Diamond Steel Hand-Forged Cutlery, Knife Sharpeners, Skate Sharpeners, Scissors Sharpeners and Household Specialties into every home on earth.

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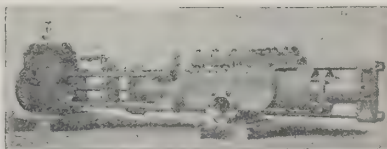
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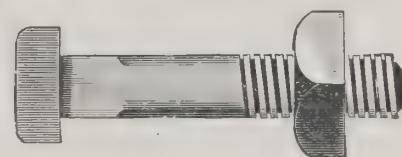
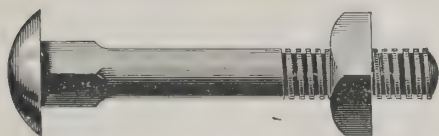
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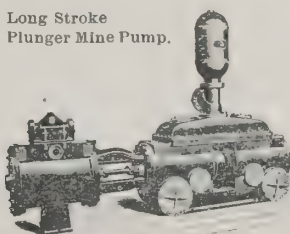
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Please write for our Illustrated Catalogue, by mail, of Presses, Type, Paper, Cards, etc., direct to our factory, near New York.

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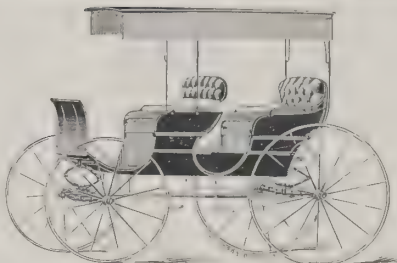
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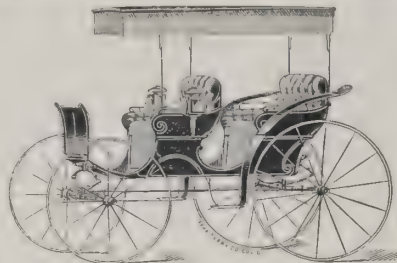


**No. 118.**

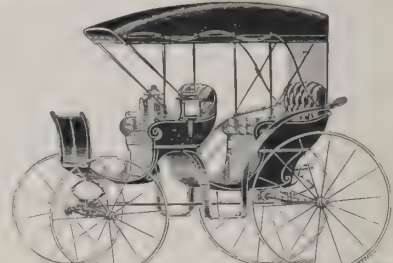
Built with 1½-inch front axle, 1½-inch rear; wheels, 1½-inch tire; full leather top except rubber side curtains; trimming, cloth or leather. **Price, \$195.00.**

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Built with 1½-inch axles; wheels, 1½-inch tire; canopy top and rubber curtains; trimming, cloth or leather. **Price, \$130.00.**

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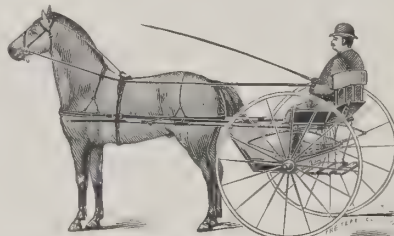
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Order direct or through your agent. In every case send us duplicate of order. Prices named herein are for complete vehicles, painted and trimmed. We also furnish any of our Vehicles in white (no paint), either with or without trimmings.

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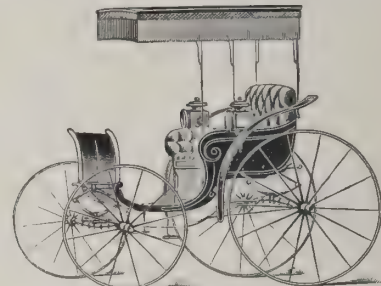
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**No. 5. General Purpose Cart.**

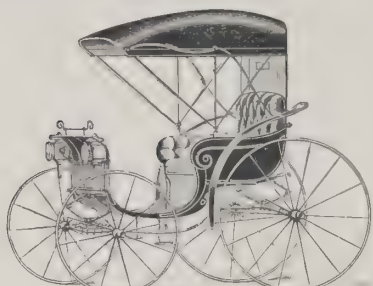
Built with 1½-inch axles; wheels, 1½-inch tire, 50 inches high; entrance from behind; one-half of seat raises, making access easy; seats three comfortably; trimming, imitation leather. **Price, \$42.50.**

Correspondence Solicited.

Agents wanted and protected in territory.

**No. 60.**

Built with 1-inch axles; wheels, 1-inch tire; canopy top and rubber curtains; trimming, cloth or leather. **Price, \$105.00.**

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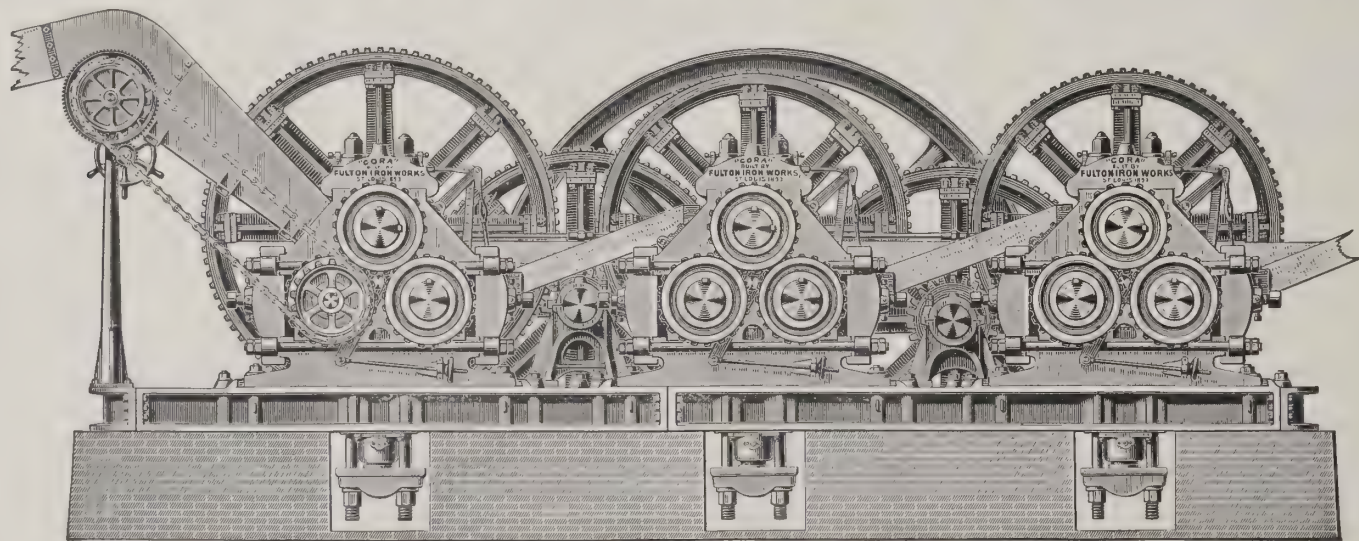
Built with 1-inch axles; wheels, 1-inch tire; full leather top except rubber side curtains; trimming, cloth or leather. **Price, \$90.00.**

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Built with 1-inch axles; wheels, 1-inch tire; full leather top except rubber side curtains; trimming, cloth or leather. **Price, \$85.00.**

# "CORA" Nine-Roller Cane Mill.

CORRESPONDENCE SOLICITED.



ESTIMATES FURNISHED.

Built by **"FULTON IRON WORKS,"** St. Louis, Mo., U. S. A.

Per S.S. "COPTIC"

FULTON IRON WORKS, St. Louis, Mo.

HONOLULU, H. I., June 17th, 1895.

Dear Sirs: The nine-roller mill and Corliss engine built and erected for us by you last year has given perfect satisfaction, and we take pleasure in furnishing you with the following report covering work performed by it during the season just closed. Days grinding, 104¾; Tons of cane ground, 61,617.928; Tons of cane ground per day, 588.238. Extraction: 92.49 per cent. total sugar; 82.13 per cent. of cane; Dilution, 7.91 per cent.; Fibre in cane, 11.02 per cent. Average load on hydraulics, 313.2, 334, 344.5 tons.

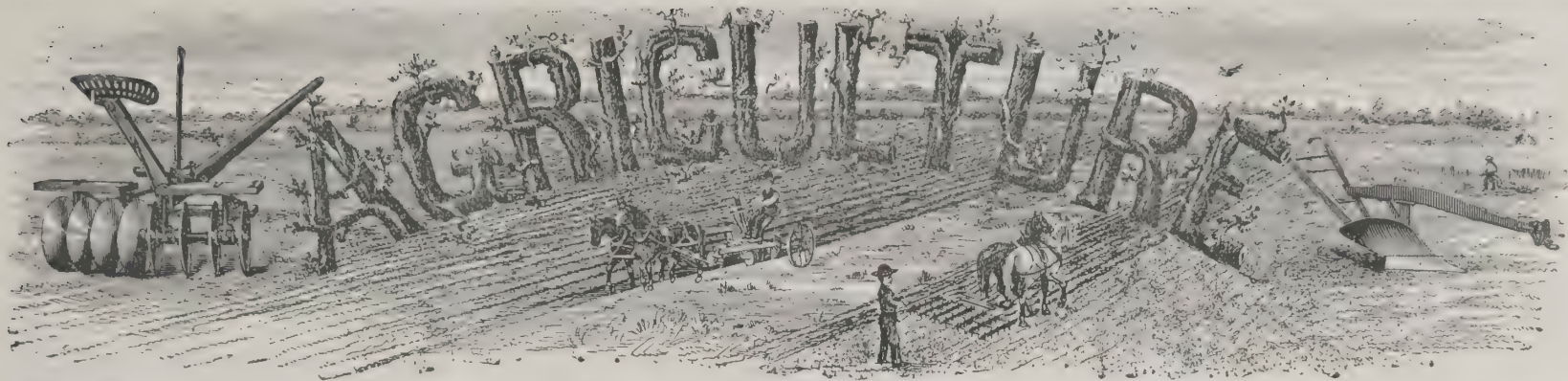
It is hard to say just what is the capacity of this mill, as our boiling house is not of sufficient size to admit of a prolonged test, but we would say that we have ground on a short run over 50 tons of cane per hour, and with an increase of from 50 to 75 tons in the load on the hydraulic obtained an equally good extraction. We believe we have the best mill on the Islands.

Very truly yours,

EWA PLANTATION CO.,

E. D. TENNEY, Secretary.





DEVOTED TO THE FOREIGN TRADE IN AGRICULTURAL MACHINERY AND IMPLEMENTS

### Oregon a Good Flax Country.

DR. H. L. DEIMELL, a large manufacturer of linen underwear in Germany, recently paid a visit to Oregon for the purpose of studying the possibilities of flax-growing in that State and aiding the work of the Women's Flax and Hemp Fibre Association of Oregon.

He was very favorably impressed and praised the fibre samples submitted to him as of the best quality. He wondered much that such a vast field of wealth as is evidently possessed in the State should have been allowed to lie untouched for so many years.

Dr. Deimell was anxious to see the results of the experiments to be made with flax-growing, as he regards the State an excellent location for a factory, if fibre in sufficient quantity can be grown to warrant it. The quality of the fibre shown him is finely adapted to the manufacture of linen-mesh underwear, as well as many other fine grades of linen fabric. The duty imposed for importing such articles into this country is so high that the establishment of a factory here would be considered immediately following the demonstration that fibre in large quantities can be produced.

"I have received samples of Oregon fibre," said Dr. Deimell, "which were submitted to our spinners. They pronounced it as having the highest qualities that can be expected of flax, which are, length, fineness and strength. It is especially adapted to our business. We require an excellent fibre, and yet one that is soft. For the coarser grades a coarser fibre is required, but that could be grown here as well as the other. If we should establish a factory in the State at the present time the gross business of the first year would approximate \$1,500,000. But a factory cannot be established within three years, as it will require that time to make all the experiments, get the spinning properly regulated and other details in condition, and by the end of three years there would likely be such an increase in our trade in this country that the first year's business would aggregate \$2,000,000. It is a matter of great importance to have a factory located in the United States, as there is a great and growing demand for our goods here, and at present on each \$100,000 in value imported a duty of \$35,000 is paid. We have to make our profit, not only on the original investment, but on the money expended in payment of tariffs. This immense item could be saved if the proper conditions for a factory could be found here.

"I regard this State as fitted by nature for the growth of flax. Other States have their commodities that have enriched them, each devoting its main energy in the production of that most adapted to its soil. I believe that in Oregon, flax is that article, and that it will overshadow all other industries when once established. I have been much impressed with the similarity of the climate to that of the flax-producing portion of Germany. The moisture, temperature and even the vegetable growths, are very like in the two countries.

"The magnitude of the demand for linen has experienced a marked increase within the past five years; in fact, there has been a revival of the linen industry. For the past century linen has been comparatively neglected until the last few years. Flax will be in greater demand in the future than it has been heretofore. Wool is growing more in disfavor as a garment next to the skin, and linen is taking its place. A country that possesses the facilities for producing flax and manufacturing linen therefrom had best develop them. It will prove adapted to the demands of the future."

### Canaigre Planting.

A VISIT to Rialto, Cal., shows that the Canaigre Company has 600 men at work, some of them being employed at gathering the root all through the country as far off as Elsinore, writes a San Bernardino correspondent. A gang of choppers, numbering fifty, are cutting off the tops of the roots for planting and stacking up the remainder for slicing when the machinery comes. The upper part of the root has all the "eyes" of the plant, which will produce new growth, and these will be planted like potatoes. For this purpose the company has a number of machines coming in a few days that will plant and cover automatically the pieces of roots from the size of a man's thumb to the size of his fist. There is another machine for slicing the roots after the manner of Saratoga chips. These chips will be spread out to dry and then pulverized. They are then leached, the liquid extracting the tannin, which is then ready for use. The slicing, drying and pulverizing will be done at Rialto, and probably the leaching, but the latter is not given out as a positive fact. The workmen have 5,000 acres cleared, of which 3,000 acres are plowed, and it is expected that 8,000 acres will be planted this Spring.

### Exports of Corn.

ONE of the extraordinary commercial developments of the last few years has been the great increase in the export of corn. We are shipping more corn than wheat to Europe and have been doing so for some months past. Why is this, and how has it come about?

It seems to be forgotten that twenty years ago we did a large export business in corn. In 1876, for instance, corn to the amount of 50,910,532 bushels was sent abroad, principally to the Continent of Europe and the United Kingdom. The same year witnessed exports of only 74,750,682 bushels of wheat. In the following year the corn exports exceeded those of the finer grain by about 15,000,000 bushels, and for the succeeding twelvemonth the excess of wheat was only about 5,000,000 bushels. A great change occurred when the American wheat production increased, however, and in 1888 the corn sold to foreign consumers was only 25,360,869 bushels. Since then we have shipped less corn every year, while the Western farmers have done a large business with their wheat. Latterly the amount of corn exported has been so small that the Commissioner of Agriculture sent a commissioner to Europe, Col.—frequently called "Corn-meal"—Murphy. His mission was to introduce the European public to the advantages of corn as an article of food. He was sent abroad on the theory that the failure of the people of the Old World to use corn as an article of food was due to their ignorance of how to prepare it and that if they could be interested on this point they would be the great consumers of corn. He travelled over the Continent introducing meal and the other various preparations of corn and met with great favor everywhere. There has been a remarkable increase in the European demand for corn of late, but how far this is due to Col. Murphy's corn campaign abroad it is impossible to say.

Last year we shipped more corn to Europe than we had ever done before, and the indications are that we will do even better for 1897. Corn is growing in favor abroad and the supply can scarcely keep up with the demand. England is the largest consumer of our corn, the exports to that country for 1896 amounting to 57,169,336 bushels and the wheat to 57,187,269 bushels. Germany imported 20,268,004 bushels of corn at the same time and 2,884,220 bushels of wheat, together with 197,061 barrels of flour. France, for the same period, took of corn 5,021,757 bushels and all the rest of Europe 27,614,227 bushels. The wheat which went to France was but 210,634 bushels, with 1,100 barrels of flour, and to all the rest of Europe 9,997,973 bushels, with 1,050,735 barrels of flour.

The demand for corn is greater than the demand for wheat and the cheaper cereals seem to be rapidly supplanting the dearer. The question naturally arises whether we have not made a mistake by converting the European public from consumers of wheat to consumers of corn. Will we not lose by selling 100,000,000 bushels of corn abroad instead of 100,000,000 bushels of wheat, as the former brings so much less return in money?

### Sheds for Farm Implements.

WHEN the term of usefulness of farming implements, which with good care, should last many years, ends with one or two seasons, only through the want of ordinary care, the farmer is too apt to suspect that it is due to the original worthlessness of the implements. Hence it might be advisable from a business point of view for the dealer occasionally to suggest to the purchaser that one of the most important and economical adjuncts of the farm is a tool shed. A true estimate of the loss caused by the lack of it would, indeed, be startling. Agricultural implements, from the steam engine to the rake, should be housed when not in use. To see the tools and implements on a farm preserved by housing is an evidence of thrift, indicates prosperity and is a recommendation for credit.

### Portable Cotton Gin and Press.

A TENNESSEAN has patented an invention which should prove even a greater boon to the small cotton planters of the South than the travelling threshing machine is to small grain growers. It can be mounted on a wagon frame, whose length need not exceed 16 feet, and contains an elevator feeder, gin with doffing brush and discharging chute, packer, press and mechanism for tying the bales and removing them from the press. To persons not able to erect gins of their own and who are compelled to haul their loose cotton often many miles to a central gin this apparatus will prove a great saver of time, labor and money.



### To Recover Our Butter Trade.

It is reported that the Department of Agriculture has been trying the experiment of shipping butter to Europe to sell, especially in the English market, in competition with Danish butter. The object of the experiment was stated to be to determine what improvements in facilities for shipping are necessary. The startling facts in this connection are that our dairymen have nearly lost their foreign butter market. The butter exports of the United States were formerly important, but have suffered a severe falling off recently. The total dairy production sent abroad last year brought \$6,299,570, and most of it was cheese to Great Britain and Canada, and butter to the West Indies and South America. Oleomargarine takes the lead now, and the exports of that commodity for 1896 amounted to nearly \$9,000,000. In 1894 the exports of oleomargarine amounted to only \$475,000, while the exports of butter amounted to \$2,077,608 and the exports of cheese to \$5,180,331.

The new efforts are for the purpose of regaining and enlarging upon the lost butter trade by delivering packages in fresh and cool condition. The experiment may lead to the establishment of refrigerator ships for butter on the plan of the present refrigerator ships for meats.

### Exports of Farm Products.

THE United States is the largest exporter of agricultural products in the world. It is interesting to study the matter of these exports, and to see what countries are its patrons, so as to be better able to satisfy their tastes. It is, of course, well known that the United Kingdom takes more than any other land. This is not, however, wholly because it is the largest consumer, but because it handles many of our products and re-exports, being a great distributing point.

The Agricultural Department has just published the record of the export of farm products for the last five years, and this can be studied with advantage.

The United Kingdom takes nearly all the cattle we ship, 96.7 per cent. of the total, with only 3.3 per cent. for the rest of the world. This percentage is increasing, for in 1896 Great Britain took 98.3 per cent. of all of our cattle, France and Germany, two of our largest patrons formerly, having shut out our cattle altogether.

With horses, however, it is different, and the following table shows that they are more widely distributed:

	Per Cent. of Total.
United Kingdom.....	41.2
Canada.....	29.7
Germany.....	12.4
Mexico.....	4.7
Belgium.....	2.9
Central America.....	2.2
France.....	1.5
Other countries.....	5.4

Of sheep Great Britain takes 83.3 per cent., Canada 8.7 and Belgium 3.1. Why that little kingdom takes more than all the rest of Europe (England excluded) it is difficult to say.

Of our butter Great Britain takes 44.4 per cent. and the Latin-American countries to the south of us 32 per cent. It seems somewhat singular to learn that 6.3 per cent. of our butter exported goes to Hayti, 5.3 per cent. to Venezuela and 1.3 per cent. to far-distant Hawaii. Of cheese 82.8 per cent. goes to England, 12.9 per cent. to Canada, and only 5.3 per cent. to all the rest of the world.

Hides and skins are the two articles which England does not monopolize, and it stands far down in the list, as the following table shows:

	Per Cent. of Total.
Canada.....	81.5
France.....	23.1
Germany.....	19.6
United Kingdom.....	13.1
Belgium.....	4.4
Italy.....	3.9
Other countries.....	4.4

There are three kinds of beef exported, fresh, canned and salted beef, divided as follows among the countries to which they are sent:

	Fresh, Per Cent.	Beef Canned, Per Cent.	Salted, Per Cent.
United Kingdom.....	99.7	60.6	48.0
Germany.....	...	8.9	11.5
France.....	...	7.5	.9
Netherlands.....	...	3.3	2.9
West Indies.....	...	...	14.6
Canada.....	...	...	9.7
Belgium.....	...	...	2.3
Other countries.....	.3	19.7	10.1

It will be seen that no other country except the United Kingdom cares for our fresh beef. The canned beef is more generally distributed, but goes mainly to Europe, while the salt or pickled beef is in greater demand in other American countries, chiefly to the south of us.

Of tallow exported Great Britain takes 36.1 per cent. and the Netherlands 21 per cent., but what our Dutch neighbors do with so large a quantity of this product is not said. Nearly half of our oleomargarine goes to the West Indies, 48.9 per cent., the people of those islands being evidently not very particular as to what they eat in the matter of butter. The Netherlands take 14.7 per cent., Germany 12.9 per cent. and Great Britain only 5.6 per cent. Of the oleomargarine oil the Netherlands take the bulk, 61.4 per cent., leading the world in

tallow and its products. Germany comes second, with 22.3 per cent., and England third, with only 7.4 per cent.

The following is the distribution of the product of "the great American hog":

	Bacon.	Hams.	Pork.	Lard.
United Kingdom.....	81.5	80.9	21.2	35.7
Belgium.....	6.8	4.1	.4	7.0
Brazil.....	3.1	...	.7	2.4
Germany.....	2.4	1.4	3.6	21.5
Netherlands.....	1.8	1.1	1.3	8.0
Canada.....	1.5	2.2	17.3	.8
West Indies.....	1.2	7.0	44.0	10.6
Other countries.....	1.7	4.3	12.6	24.0

Of our wool exported nearly all goes to other American countries, 47.6 per cent. to Canada and 29.2 per cent. to Mexico, Europe taking only 22.8 per cent. of the total.

It is the same of bread and biscuits, of which 60.3 per cent. goes to the West Indies and the rest to other parts of America on the Pacific, none finding its way to Europe.

The distribution of our cereals is as follows, much of the grain shipped to England, however, being for distribution in other countries:

	Wheat and Flour.	Corn and Meal.	Barley.	Oats.	Rye.
United Kingdom.....	57.8	48.4	76.7	63.0	6.4
France.....	2.0	3.1	.8	7.7	...
Netherlands.....	5.7	8.1	.3	7.2	16.6
Belgium.....	5.7	4.0	4.2	6.0	...
Canada.....	3.9	9.0	...	4.4	18.9
Brazil.....	2.6	...	...	...	...
Germany.....	2.4	14.7	...	4.1	31.5
Portugal.....	2.1	...	...	...	...
Denmark.....	...	5.5	...	...	6.1
Mexico.....	...	3.8	.6	.3	...
Hawaii.....	...	...	7.2	...	...
Sweden.....	...	...	...	...	8.3
Other countries.....	11.8	6.4	10.2	7.3	12.2

The South's great products, cotton, cotton-seed oil and meal, are thus distributed:

	Cotton.	Oil.	Cake and Meal.
United Kingdom.....	53.3	9.7	50.0
Germany.....	19.0	11.4	26.5
France.....	11.5	14.4	1.5
Italy.....	4.1	4.4	...
Spain.....	4.0	...	...
Belgium.....	2.2	1.2	...
Russia.....	2.0	...	...
Canada.....	1.4	2.3	.3
Netherlands.....	.4	35.7	7.6
Other countries.....	2.1	20.9	7.1

The only other farm product of which we export more than \$10,000,000 worth is tobacco, which also comes mainly from the South. This is very widely distributed, the United Kingdom taking less than one-third of our exports, or 32.2 per cent.; then follows Germany with 17.4 per cent., France 12 per cent., Italy 10 per cent., Belgium 7.7 per cent., Spain 5.2 per cent. (in spite of its ownership of Cuba), the Netherlands 4.6 per cent., Canada 5.2 per cent., and the rest of the world 5.4 per cent.

From these figures some idea may be gained of how largely the United States contributes toward feeding and clothing the world, and, indeed, supplying it with all it needs.—*New Orleans Times-Democrat*.

### Improved Method of Cotton Baling.

A RADICALLY new method of baling cotton has been perfected within the past few months, which is apparently destined to consign all the present forms of compressing machinery to the scrap heap, and even to exert a still more far-reaching influence upon the entire cotton industry, inasmuch as in the future cotton will be shipped direct from the plantations in the form of round bales, completely inclosed by machine-made, closely woven coverings, from which there will be no likelihood of loss from thieving, or of accidental wastage due to "loose" cotton.

The cotton, instead of being compressed from a loose bundle, is, by the new method (called Bessonette), put through a sort of combined carding and rolling machine, from which it emerges in the shape of an endless ribbon or wide cotton belt, resembling coarse felt, pure white in color, and with its fabric uninjured. By an automatic device the band is rolled into a bale of any desired weight and size, removed from the machine, the cover slipped over it, the ends "gathered" and fastened, and the bale properly marked for identification and shipment. These bales, owing to the method of rolling the cotton in thin sheets like rolls of paper, are uniformly dense, and weigh thirty-eight pounds to the cubic foot, as compared with twenty-five pounds by the old method. This means immense economy in freight; and owing to closer packing capabilities of the cylindrical bales, it is found that a car will carry one hundred round bales in the space occupied by fifty ordinary bales.

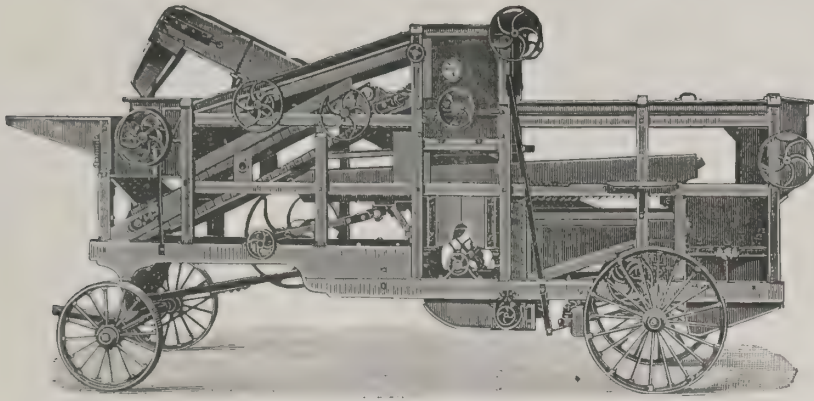
The "core" or centre of an ordinary bale is comparatively spongy, containing air space, so that the tendency of fire is to eat inwardly into the bale. Remarkable fire tests have been made with the new bale, proving that it is comparatively, if not absolutely, incombustible, and Mr. Edward Atkinson proposes to christen it "the underwriters' bale" on this account. So enthusiastic is this well-known authority on fire insurance, and on industrial matters generally, that he is reported to have said regarding this process: "The man who first conceived a cylindrical bale, made lap by lap, with the air excluded, has done more to modify and improve the treatment of cotton throughout its course from the field to the fabric than any man who has existed since Whitney invented the gin."



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MANUFACTURERS OF



Thrashing Machines, Saw Mills,  
STATIONARY, PORTABLE AND TRACTION ENGINES,  
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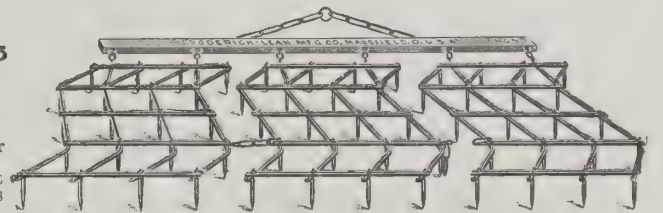
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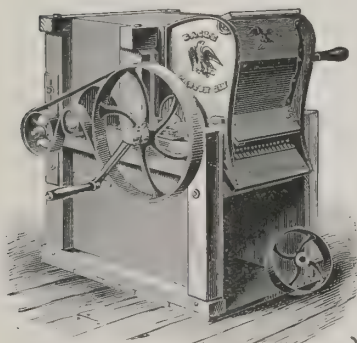
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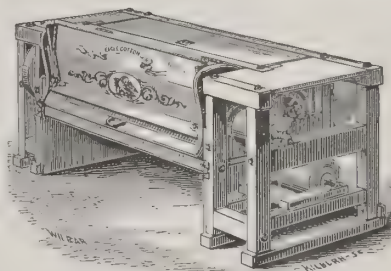
## EAGLE COTTON GINS.



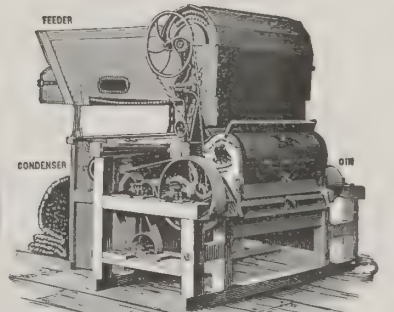
These Gins enjoy a BETTER REPUTATION THAN ANY OTHERS OF THEIR CLASS IN EXISTENCE, and are PREFERRED to all others made, on account of their STRENGTH, SIMPLICITY, DURABILITY, the amount and EXCELLENCE of the work they accomplish, and the RAPIDITY of their operation.

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ITS PURITY AND DELICACY ADAPT IT TO BEING USED IN A GREAT VARIETY OF EXQUISITE DISHES.

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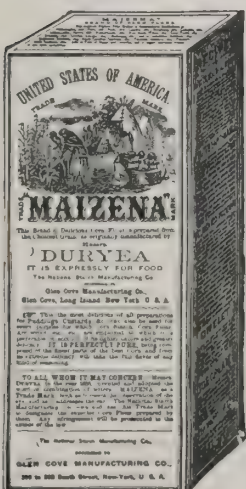
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# ELECTRICAL NEWS.

## Loading Ships by Electric Power.

A FEW years ago the idea of loading a ship with 2,500 tons of flour in twenty-four hours by means of two small motors would have been looked upon as absurd. This was done recently in Tacoma. Two thousand tons of cargo have frequently been loaded or unloaded in a day by steam power, but the important factor in the record-breaking achievement at Tacoma was that the conveyor was worked by electricity. With the apparatus which has been designed for this purpose flour and grain can be loaded at any stage of the tide, and independently of the weather. If it should rain a canvas is quickly spread from the door of the warehouse to the ship's hatch. With the system of loading ordinarily used eighteen men are required to do the work of one electric conveyor, with which the bags are delivered into a ship's hold at the rate of 2,500 to 2,700 pounds a minute, or seventy-five tons an hour. When extra speed is desired two conveyors are employed. This was done when the record of 2,500 tons in twenty-four hours was made. The electric conveyor is 40 feet long. It is moved at will on two wheels in the centre. A two horse-power motor supplies the power, the current being taken from the nearest electric wires. The sacks are placed on a revolving belt of rubber, which passes over twelve rollers. The belt is propelled by a driving wheel, attached to the side of the apparatus. The rollers are placed close enough together, and the belt revolves at sufficient speed to carry all the weight in flour and grain that can be placed upon it. The conveyor works as well when placed at an angle of 45 degrees as when on a level.

## Electric Letter Box.

THE electric letter box is by no means an unfamiliar device. As the postman's mail is dropped into the street door box electric contact is made and a bell is rung in the kitchen. This is a very simple and admirable provision against the possibility of an important letter that may demand an immediate reply lying unnoticed in the box. A variation of this device is now used for calling the attention of postal clerks to the incoming of special delivery letters. The invention, which is credited to a former letter carrier, consists of a slanting box, at the lower end of which there is a sheet of metal working on swivel points. When the letter is dropped into the box it slides down upon the metal sheet and holds the lower edge down, thus making an electric circuit that rings a bell continuously until somebody goes to the box and lets the letter out, which is done by unhooking and raising the front part of the box. Electric letter boxes are the newest addition to the department houses.

IN order to meet the rules of the New York Fire Department relating to the electrical installations there has recently been brought out a novel motor controlling box. It is a neat apparatus and embodies a high and low resistance starting box, together with a double pole knife switch and fusible cut-out, also mounted on the marbleized slate plate forming the front of the box. The resistance consists of coiled wire open to the air.

The pivoted contact bar is made up of two parts, one forming the contact arm proper, and the other, with which it is loosely connected, serving as the iron armature of an electro-magnet placed on the other side of the slate. The contact arm is pivoted on one pole of this magnet, while the other is placed at a slight radial distance therefrom, and acts as a stop for the iron armature, which strikes against it when the resistance is all cut out.

The magnet which controls the arm is wound differentially, one of the windings being in series with the armature, while the other is in series with the shunt field. Closing the main switch and moving arm to the right, connects the field of the motor and cuts out the armature resistance. This increases the motor speed and the maximum is reached when the iron arm strikes the stop and is held there by the magnet. The windings of the magnet are arranged so that under normal conditions the winding in series with the shunt field overbalances the other until the predetermined overload limit is reached, at which point the increased current in the latter neutralizes the magnetic effect, and releases the contact arm. An open circuit produces the same result. This starting box may be operated with or without the overload feature.

It will thus be seen that this starting box not only starts the motor, but also protects it from damage by overload or current interruptions.

A SUCCESSFUL horseless carriage, to seat four people and the driver, has made its appearance on the streets of Indianapolis, Ind. Its motive power is a small gasoline engine, and it can run fifteen miles an hour or move as slowly as a funeral procession. It has solid rubber tires and is propelled by endless chains running around sprocket wheels fastened to the rear wheels. It has made twelve miles an hour over ordinary country roads and went uphill as steadily and rapidly as on a level. The maker, encouraged by the success of this one, will soon put up others with seats for six.

A MAN in Brooklyn, N. Y., has invented and manufactured a horseless carriage, run by electricity, which, he claims, is as light as a victoria, noiseless as a bicycle, fast as an express train, handled with ease and costs \$500. It resembles a pheasant. The wheels are pneumatic tired, the springs of the latest improved invention and the mechanism light, simple and inexpensive. The same patent can be used to propel fire engines, brewery wagons, stages and other heavy vehicles. Maximum speed, thirty-five miles per hour.

## Electric Railways Abroad.

THE American companies which manufacture electrical machinery for street railway purposes are limited to a few, but they include our largest in the dynamo and motor business. *Hardware*, in a recent issue, says that the export trade in this line, especially to Europe, is good. Some electric railway work is now being undertaken in the Spanish cities of both continents. The cities of Granada and Cordova, Spain, are proposing to install such systems, and will consider offers from American sources; some members of the Spanish Club, St. Louis, Mo., evidently acting as intermediaries.

On the American Continent, in Buenos Ayres, the first electrical railway in the Argentine Republic is being begun. The concession for the road was obtained by a company organized in the United States. Twenty-six miles of road are in contemplation, to be equipped with double-decked cars, propelled each with two 25 horse-power motors, geared to the axles of the two bogies carrying the frame of the cars. The plant will include four Stirling water tube boilers, aggregating 950 effective horse-power, with three high-speed vertical compound Ball & Wood engines, of 450 horse-power each, directly connected to 300 kilowatt continuous current Walker dynamos.

THE success of the operation of long-distance electrical transmission is perhaps best gauged by the opinion expressed by the company operating the plant. An extract from a recent letter of this kind regarding the operation of the Fresno, Cal., long-distance transmission may be interesting to our readers: "It affords me great pleasure to write to you regarding the successful operation of the long-distance transmission plant installed for our company. The entire plant, as furnished, has been in actual practical operation for a period of several months. The thirty-three miles transmission has given us no trouble whatever. Our load at present consists of 145 arc lights and 5,000 incandescent lights and 410 H. P. in motors, the latter including 180 H. P. for the Sperry flour mill and 75 H. P. for the city pumping plant. All of the machinery doing this work has worked with perfect success from the start. The incandescent lights have most of them been newly wired in, thus enabling us properly to balance the load, and the regulation has given us no trouble whatever. During extensive tests it was impossible to find more than two volts variation between any lamps on the system. Lights so furnished seem to me to be better than incandescent lights usually furnished in San Francisco and other cities of the State."

MR. TESLA exhibited recently in New York the wonderful new apparatus which he called electrical oscillators, a novel kind of transformers based upon a discovery made by him six years ago which enabled him to produce from ordinary currents, direct or alternating, electrical vibrations of 1,500,000 per second. These vibrations were desirable for the attainment of many practical results, the most important being the improvement of electric lighting. This system is inefficient and expensive, and to produce the same or better results upon lines of economy requires enormous electrical vibrations, which Mr. Tesla has been able to secure by his new apparatus. These vibrations can be used in many other ways for the economical production of things necessary to mankind. Mr. Tesla said that they could, for instance, be used profitably in the manufacture of ozone and other chemical products and fertilizers. He said it furnished an ideal instrument for the production of the Röntgen rays. Its advent means the abolition of many devices of older design, particularly, Mr. Tesla said, of the use of the induction coil. A remarkable feature of the machine Mr. Tesla exhibited was that, although it can furnish any pressure desired, it contains no fine wire.

IT is stated that a large firm manufacturing dynamos and motors is at work upon a motor that will run at a speed of 10,000 revolutions per minute. This motor, if it can be successfully constructed, will be used by the United States Government on men of-war to start the propelling machinery of Howell torpedoes just before they are fired from their tubes. This torpedo is propelled by the energy stored in a small fly wheel inside of it, made to revolve at a speed of 10,000 revolutions, and at present a steam turbine is the only motor of simple form that is available to rotate the fly wheel at that speed.

—Electricity is used in tanning hides in a new process, the skins being hung on frames in a vat and the current passed through the liquid by means of electrodes placed on opposite sides of the vat parallel to the skins.

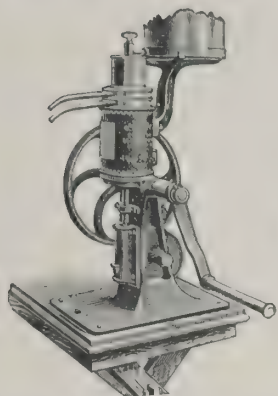
—The Philadelphia Engineering Company, of Philadelphia, Pa., have just completed one of the largest steel smokestacks ever constructed for an electric-light plant in Yokohama, Japan. The stack is 175 feet high, 7 feet 3 inches in diameter and weighs 95,000 pounds. It will be shipped by rail to Tacoma, Wash., and thence to Japan.

—The Government of Siam, it is reported, has granted to Mr. Bennett, an American citizen, a franchise for the exclusive electric lighting of Bangkok. This is a great concession, and is attributed to Minister Barrett's diplomatic settlement of the recent trouble, and is noteworthy as a further development of American interests in Asia.

—John T. Lally, of Wilmington, Del., has invented an electric lighter which has been placed in the engine house of the Reliance Fire Company. The lighter is fastened to the floor, about 18 inches in front of the engine, and as the engine strikes the lever the electric spark lights the gas, which throws a flame to the height of 14 inches and about 4 inches in width, so as to light the kindling in the engine. There is no waste of gas. The arrangement is very complete.



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100,000 machines in use in every country in the world.

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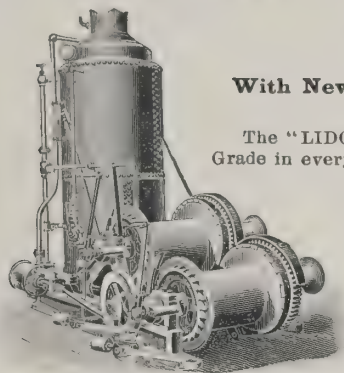
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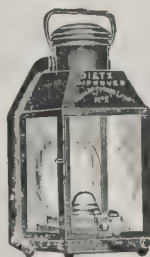
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Is most desirable for sheds and porches, also for barns, stables, outbuildings, etc., where "no smoking" is desired. This is an extra fine Lamp, made in three sizes, has no chimney, and no complication to make trouble of any sort. It has an improved burner and outside wick regulator; gives a very brilliant light that the strongest wind cannot quench—and, in general, it gives universal satisfaction. The list prices of the three sizes of this lamp are \$5.50, \$6.50 and \$8.50, and the export discount 40, 10 & 5 per cent.

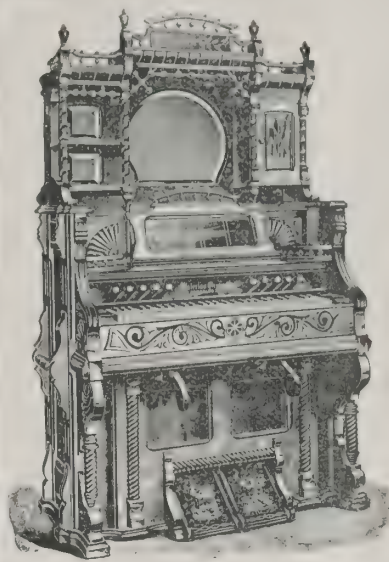


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Absolutely it will not unhook unless you unhook it yourself.

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See that

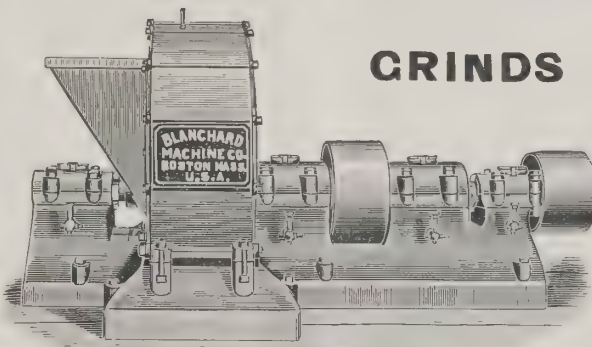
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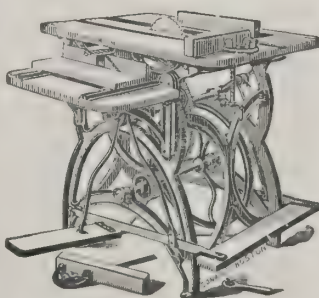
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Weights 300 pounds. Gauges slide in planed iron grooves in top. Gears are all machine cut. Shaft and arbor are made of steel.

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**TRIBUNE MODEL 27.**  
Price \$100. Weight 23½ lbs.

This is our standard men's wheel and is suitable for all kinds of road use. It is built in three heights of frames, 22½, 24 or 26½. The wheels are 28 inches diameter; 26 inches will be furnished if preferred. Gear, 68; options, 60, 63, 72, 73 or 80; cranks, 6½ inches, 7 inches if preferred. If not otherwise specified, all machines will be fitted with Hartford or Morgan & Wright tires. All wheels are supplied with tool bag, tools and repair kit. Regular finish, black enamel, nickel trimmings. If a lighter wheel than the above is desired, order should specify Model 21, which will weigh with light road equipment about 20½ lbs.

## Tribune Bicycles.



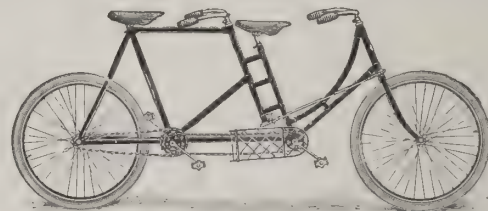
**TRIBUNE MODEL 24. Price \$100.**

Our ladies' wheels are built in three heights of frames, 20½, 22½ or 24 inches. 20½ inches is standard and will be shipped if not otherwise specified. Wheels, 28 inches, can be furnished, with 26 if preferred. Regular gear, 63; options, 56, 60, 68 or 72; cranks, 6 inches throw. The weight is about 24 lbs.

The Celebrated  
Cycloidal  
Sprocket.



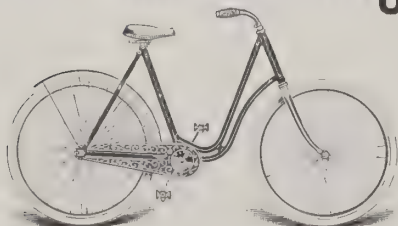
Used on  
Tribune  
Bicycles only



**TRIBUNE MODEL 23.**  
Price \$150. Weight 44 lbs.

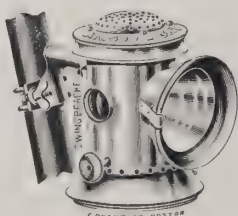
Our tandems are also built with double diamond frame for use of men riders. Wheels are 28 inches; height of frame, 24 inches; ladies' forward frame, 20½ inches. Gear, 68; can fit with 72, 76 or 80, if desired.

# For the Leading American Wheel Order the "GREAT EASTERN."



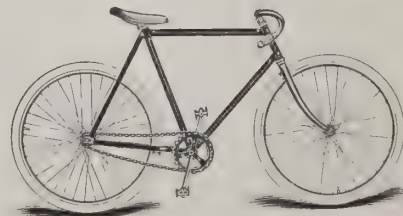
It is up to date,  
very handsome and  
attractive,  
beautifully finished  
and a great seller.

SEND FOR 1897 CATALOGUE "B."



## ALSO ORDER THE "ATWOOD LANTERN."

It is a perfect burning light; it will not jar out; it has a swing bracket, and will always stand perpendicular no matter where you lean the wheel.



**EASTERN CYCLE MFG. CO., Amesbury, Mass., U. S. A.**





THIS DEPARTMENT IS DEVOTED  
TO THE FOREIGN TRADE IN  
CYCLES AND SUPPLIES.

### America's Plan Abroad.

EVERY success won by an American manufacturer in a foreign market makes success there for another American manufacturer easier. The advantages gained to date will give impetus and direction to future efforts. The increasing volume of American cycle commodities that enter international commerce is destined to change the commercial map of the world. The day has arrived when a well-considered policy for exploiting the sale of American cycles in every foreign market can be formulated and carried into successful operation.

It will not be built upon antagonisms or deceptions, but will be girded, braced and bound into a massive structure from which all weakness has been eliminated or guarded against through rightly bringing into coöperation the mutual interests of the American producer and the foreign buyer and rider. Commerce is an exchange for the mutual benefit. Piracy is seizing an advantage without giving a benefit. It should be the mission of the American cycle-maker to develop American commerce.—*The Wheel*.

### Bicycle Patents.

TO what limits the inventing of bicycle improvements has gone is shown by the Patent Office records in the United States. Up to 1876, according to recently published figures, approximately 300 patents for cycles had been issued from that office. In 1876 invention revived on account of the excellent exhibit of English cycles at the Centennial Exhibition. Since 1876 over 4,000 cycle patents have been granted in the United States, and nearly or quite one-half of this number have been issued since 1890. In 1890 one assistant examiner of patents was able to dispose of all applications that were filed. In November, 1896, it required the labor of eight expert assistant examiners to handle the applications for cycles, and even with this force working at them there have been lately 1,000 applications constantly on hand awaiting action. At the present time, it is said, no country in the world is granting so many patents for cycles and cycle improvements as the United States.—*Cassier's Magazine*.

VICTORIA, Australia, last year imported bicycles valued at \$1,478,715, according to United States Consul General Maratta. The wheels sell at prices ranging from \$58 to \$145, and American bicycles are favorites. It is the practice of some dealers to sell wheels on time payment for the exact amount of the monthly suburban railway ticket, so that the buyer at the end of a certain time seems to obtain his bicycle free of cost. All of the leading American wheels are represented by agencies in Australia, and there is complaint that the trade is overdone, receiving 35 per cent more bicycles in proportion to population than any other country.

THERE were ten times as many bicycles sold in Mexico last year as in 1895. Sales have so far been confined almost entirely to the City of Mexico and the larger cities of the Republic. Agents are just beginning to do effective work in the more remote districts. Most of the general agents of the standard wheels in the capital have all their orders sold before the wheels arrive from the factory, and several of them have recently added new makes to their stock in order to secure enough wheels for the demand.

—A New Yorker has devised a mode of constructing a tandem out of two ordinary safety bicycles. The front wheel of the rear machine is removed and the two vehicles are ingeniously and securely coupled together.

—A saddle made of paper which has been compressed and rendered waterproof is among the new experimental features in the cycle business. It is stated as an advantage for the paper saddle that it can be manufactured in any color to match the enamel of the bicycle, and the material is susceptible of receiving a very high enamel finish, which can be renewed at slight expense, making the saddle at all times appear like new. It is fitted with the ordinary spring support.

### A New Cyclometer.

A CYCLOMETER designed and patented by George K. Burleigh is said to keep both a record of the season's riding and short trips of each day. When the continuous register is used to ascertain the number of miles ridden in a single trip it is necessary to note down or memorize the last reading of the cyclometer before starting. If a ride of a given distance is undertaken, the rider must make a calculation from time to time as to the number of miles yet to be travelled, taking up time and attention, and often wanting in accuracy on account of forgetfulness or errors in computation. This cyclometer enables the rider to see not only the season's record, but also the number of miles traversed on any particular trip, means being provided for setting the trip indicator at the beginning of a run without interfering with the general indicator.

THE Edgewood rotary bicycle gong, invented by W. G. Rankin, has been improved. The gong, as originally designed, had a ball held inside the bell by a rubber connection. The revolving of the bell with the roller pressed against the tire brought two projections in the bell's periphery against the metal ball, and made a continuous ringing. It was found that the rubber soon wore out. Then a spring of piano wire was used to hold the ball in place. This lost its elasticity after a few days' service. Now a metal disk three-eighths of an inch in diameter is mounted loosely on a rivet, and rattling is prevented by fibre washers. The disk strikes the projection on the bell, and the play allowed by the large hole gives the same results as the rubber or spring. There seems to be nothing to prevent the gong lasting an indefinite time in constant service, as the only part liable to wear out is the disk, which can be replaced for a few cents.

THE American wheelmaker knows his business; give him a fair show. The export of last year's wheels wasn't really begun till late, yet the report of the Bureau of Statistics at Washington proves that American bicycles were not scarce in the principal foreign countries. For the fiscal year ending June 30 last, says the report, the total value of the wheels exported was \$1,898,012. Shipments amounting to \$613,292 went to the United Kingdom, \$492,685 to Canada, \$145,892 to Germany, \$108,414 to France, \$84,610 to Australia and New Zealand, \$66,867 to the Netherlands, \$49,621 to Italy, \$34,856 to Denmark, \$23,843 to Norway and Sweden, \$23,127 to Belgium, \$70,593 to the countries of Central America, \$30,320 to the Sandwich Islands, \$27,056 to Japan, \$23,979 to the West Indies and \$7,402 to British Africa.—*N. Y. Sun*.

THE United States bid fair to become the bicycle manufacturing country of the world, to judge from the enormous growth of the exportation business in wheels. The value of cycles and parts of cycles exported during the eight months beginning July 1, 1896, was \$3,188,466, as compared with \$480,722 for the corresponding eight months of the fiscal year 1895-6. There has been nothing to compare with this increase in other branches, though the value of miscellaneous machinery exported grew in the same period from \$9,249,598 to \$12,693,961, and that of cotton cloths from \$7,758,051 to \$11,667,518. American ingenuity and skill are the main agents in capturing foreign markets, and the cost of the labor employed in production cuts but a small figure in the matter.

—A Winsted, Conn., concern recently received an order for 50,000 bicycle handles for export.

—It is said the bicycle rim makers were never so busy as at the present time, all the factories being behind on orders. Makers of hickory handle bars are also very busy.

—Bicycle exporters will be pleased to know on good authority that however matters may shape themselves, the American bicycle exporter to Europe has no cause for uneasiness. His position in the markets of Europe is already absolutely secure against dislodgment. The education of the foreign public to a recognition of the undoubted mechanical superiority of the American bicycle will go on.



### Trade with Japan Booming.

THE heavy shipments of machinery, rails and other railroad material and of the various furnishing equipment of different industries to Japan and other Eastern countries, are encouraging indications of a rapid and heavy development of our foreign trade. Our opportunities for deployment in this direction are opening up like a Summer fan. What this means to American industry needs no telling. The duty of the manufacturer and exporter is to cultivate this special form of trade, for on its success or otherwise hangs our destiny as an industrial people.

England is, of course, our most formidable rival in the matter of iron and steel goods, but there is no reason to believe that she will be ultimately the preferred one. There are many indications to show that Pennsylvania will absorb a large share of the profits of the trade. Thus, a few days ago four cargoes of steel rails were shipped for Japan from Philadelphia, together with a large consignment of locomotives built in the Quaker City. Again, a certain Mr. Okazaki, a representative of the Tokio Iron Works, one of the largest firms in Japan, has recently been paying a visit to Pittsburg with a view to placing orders there. To a representative of the local press who interviewed him the stranger said: "Our chief business is in iron and machinery. We are large buyers from London, Glasgow and Antwerp, but now we are inclined to buy from Pittsburg manufacturers. Pittsburg is not very well known in Japan, but from an inspection of many works here and in the neighborhood I am convinced that if I had catalogues and price lists I could easily find a large demand in our country at present or in the future, especially for iron and steel, rails, plates, bar iron and machinery, and many other descriptions of iron and steel, as well as window glass and other glasses.

WANTS TO BUY IN PITTSBURG.

"I am very much pleased with what I have seen in Pittsburg and am anxious to form connections here. We would rather buy in Pittsburg than in Europe. Pittsburg is a great town. I think it is destined to become the greatest manufacturing centre in the world."

Concerning the oil production of his country Mr. Okazaki said that there is a very fine grade of oil in Japan, but few experienced drillers, and consequently no wells deeper than 800 feet. It was partly to inform himself on this subject that he was visiting Pittsburg.

Still another commodity with which this city and district could supply Japan to their mutual advantage is glass. "Japan," said Mr. Okazaki, "is a tremendous consumer of glass, especially window glass, and having no glass factories herself, she imports heavily from Antwerp. I have visited some of your local plants and think Pittsburg able to supply Japan fully as well as Belgium. My own firm has contracts up in the millions in Europe and there is no reason why this should not come to Pittsburg."

### Carriages for Export.

AN export market is the one great desideratum, and to secure it should be the earnest effort of every man in the carriage trade. As compared with England or France, our export of carriages is a mere trifle, and yet, with few exceptions, we can sell as cheaply as either of these countries, and in other lines even sell at a lower figure. In no other country in the world is the farm wagon so well made and sold at so low a price as in this, and yet other countries have the market. In most light carriages we can undersell Europe in their own markets, and yet when we undertake to sell to the South American States we find our prices are too high to enable us to compete with the older countries. As an illustration of our failure to obtain a market in South Africa we are assured that American built vehicles have been shipped to Germany in the white, that is, ironed but not painted or trimmed, then finished and shipped by German merchants to South Africa, the prices realized being higher than the same kinds of vehicles could have been sold for by our manufacturers. In explanation we are informed that the trade referred to was secured through the German consuls. The same activity on the part of United States consuls would divert a reasonable share of the trade of those importing countries to ours. By some it is claimed that as Europe has had the trade of Africa, South America and the Oriental countries, there would be no market for American products. This we hold to be a fallacy. Those countries would afford as good a market for our products as they do for those of the countries which now supply them. All that is required is that we produce acceptable goods and sell at reasonable prices. The exporter handles all kinds of goods, and if among his orders there come some for carriages, these are filled, but no extra effort is put forth, and the manufacturer gains but little by the transaction. What is required is that the merits of American vehicles be made known abroad by skilled Americans versed in carriage lore and by persistent advertising. If this is done and our Government can be induced to extend aid to our merchant marine, the American carriage builder could obtain an equitable share of the trade of all countries where vehicles are used for pleasure or business.—*The Hub*.

—The New York *Sun* of May 11th says: "The British War Office has ordered 20,000 special transport mule wagons from the Cortland Wagon Company, of Cortland, N. Y., for immediate shipment to South Africa. The contract price of the order is \$500,000."

—A glass company has been organized in Anderson, Ind., for the manufacture of beer bottles from refuse glass, which is made possible by a new discovery. The bottles will have a deep-blue color, but will be finished carefully, and can be placed on the market at about half of the cost of the present product.

### Exports to Latin America.

THE good ship Mexican Prince, which sailed from this city recently, had on board a somewhat diversified cargo, the details of which may do as a very fair illustration of the variety of the cargoes sent from this city to South American ports. The notion is general that New York's chief exports to Europe are cereals, provisions, petroleum and tobacco, and to South American ports machinery. But a mixed cargo to South American ports is a mixed cargo, indeed, if the case of the Mexican Prince may be taken as a sample.

There were 3 cases of refrigerators, 20 of bicycles, 11 cases of typewriters' supplies, 21 packages of empty bottles, 13 cases of baking powder, 20 cases of scales, 75 consignments of plows, 5 cases of tooth powder, 26 consignments of oars, 1 case of bird cages, 1 of slot machines, 84 consignments of pumps, 1 case of photographs, 27 consignments of hay presses, 12,000 boxes of matches, 2 bales of seed, 2 consignments of rakes, 4 consignments of emery wheels, 2 cases of cigarettes, 6 consignments of desks, 4 consignments of bedsteads, 4 consignments of cartridges, 60 boxes of clocks, 2 cases of towel racks, 31 harvesters, 1 case of phonographs, 24 boxes of soap, 40 stationary engines, 152 sewing machines, 100 cases of shoe blacking, 108 consignments of chairs, 11 cases of typewriters, 400 paper boxes, 3 consignments of firearms, 6 consignments of toys, 165 boxes of carpet tacks, 800 sets of harness, a bale of sponges, 59 cases of sandpaper, 377 packages of illuminating lamps, 5,000 pounds of candy, 15 machines for rice manufacture, 26 bales of wicks, 700 gallons of benzine, 100 pounds of confectionery, 1,000 gallons of naphtha, 1,000 yards of oilcloth, 377 consignments of cutlery and 200 bottles of American medical bitters.

On the same day the good ship, Finance cleared for Central America with a mixed cargo of candles, hardware, photograph apparatus, stationery, paper and drugs. Other items of American exports to South and Central America were cotton duck, pumps, codfish, hats, hams, telephone receivers, perfumery, carts, bottled beer, clothes wringers, paints, staves, stove polish, bellows, whips, oleomargarine, cartridges, peanuts, tape, cider in barrels, coffee roasters, ice cream freezers, crucibles, twine, hoes, forks, cots, needles, wheaten grits and netting. American exports to South and Central American cities are much more varied in kind than is usually believed to be the case. The exportation of agricultural implements is large to only one country of South or Central America—the Argentine Republic. American books are extensively exported to Brazil, coal to Cuba, machinery to Brazil, lard to nearly all South American ports, dairy products to the West Indies, wood to Honduras, woollen manufactures to Mexico, fish to the West Indies, cotton goods and wearing apparel of cheaper variety to the Central American States.—*N. Y. Sun*.

REFERRING to a new process of wood decoration used as a substitute for hand carving, Mr. Adolph Karpen, manager of the company which owns the patent, writes to *The Wood-Worker*: "This new process of wood decoration is similar to what is now being used on piano panels. The work on piano panels is, of course, made by hand, consequently very expensive; this process, however, is inexpensive and produces tasteful and artistic effects. It requires no skilled labor, and the work can be produced in no other manner. I decorate in the various woods, and by using contrasting colors the effects produced are very beautiful and artistic. A number of the leading piano houses in the West have already purchased the right to use this process, as well as a number of furniture manufacturers. It is creating a great deal of talk in the trade and quite a number of manufacturers from various parts of the country have specially come to Chicago to see samples of this work. I am disposing of shop rights for the use of the process under this patent."

SANTO DOMINGO is having a lot of silver coins made at 29 Gold street, New York, and before the month is out about 150,000 of the coins will be on the way south. There are to be four kinds of coins stamped, which correspond to our dollars, half dollars, 20 cent and 10 cent pieces. They are the "peso," "medio peso," "20 centavos" and "10 centavos." The weight of the coins will be stamped on them too. There are to be 1,725,000 coins in all. The coins are all alike so far as the head of Liberty on one side and the coat of arms on the other go. Approximately their size is the same as that of the United States coins of similar so-called value. The issue is of 1897, and was brought about by a commission appointed by the Dominican Government, which had to come to the United States to have the work done. It is said that this is the first time any foreign country ever came to the United States to have its coins cast.

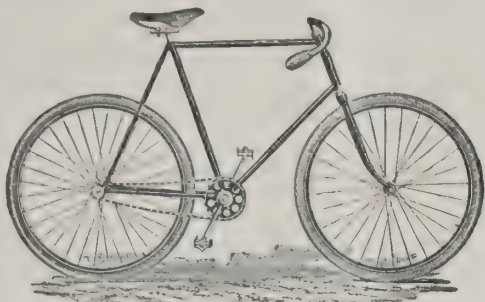
AMERICAN cotton is rapidly superseding that of India in the markets of Japan, because of its superior length and strength, and a representative of the Japanese Government is making an investigation into the methods of cultivating and handling the staple in Texas and other Southern States, from which valuable results are likely to follow. The New York *Mail and Express* says: "The shipments of the American product to Japan are increasing at a rapid rate, and with reasonable effort to meet the wishes of the Japanese manufacturers in the matter of packing and transportation the cotton planters of the South will soon be in full control of a vast and profitable market for their crop."

BY a Water street export firm there were shipments the other day to Mexico valued at upward of \$50,000 in a variety of manufactured goods. According to the buyer of the house there are included in the shipments a quantity of furniture, glassware, railway track materials and several heavy pieces of machinery. On account of the overstocked condition of storekeepers in some of the large cities in Mexico, he added, it has been upward of two months since we had a shipment for anything like such an amount.



**THE NORTHAMPTON** Strictly High-Grade **BICYCLE.**

MADE BY SKILLED MECHANICS.

Constructed  
from the  
Best Material  
Obtainable.Liberal  
Guarantee.Two Models,  
Ladies' and  
Gents'.Write for  
Catalogue.

**THE NORTHAMPTON CYCLE COMPANY,**  
NORTHAMPTON, MASS., U. S. A.

Our English Catalogue will explain to you how and why we claim that

'97 *Outing* BICYCLES. \$100

are the most serviceable line of wheels ever placed upon the market. We don't seek to hypnotize buyers into taking anything what they don't want.

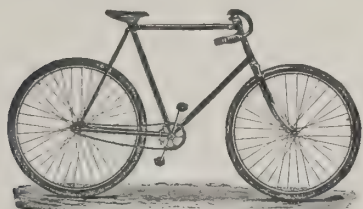
You tell us what you want and you get it.  
That's business, is it not?

Every fitting is of the highest known grade. You may have any high-class tire, saddle, rims, pedals or anything else that goes with a good wheel, that you specify.  
Send for Art Catalogue printed in Spanish, French or English.

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INDIANAPOLIS, IND., U. S. A.



Men's No. 7, 24 lbs., \$100.

**ACME CYCLE CO.,**

ELKHART, IND., U. S. A.

A. B. C. Code. Cable Address: "ACCYCLE," ELKHART, IND., U. S. A.

ORDERS ACCEPTED THROUGH RELIABLE COMMISSION HOUSES.

ALWAYS MAIL COPY OF ORDER DIRECT TO US.

DIRECT ORDER MUST BE ACCOMPANIED BY CASH.



Women's No. 6, 25 lbs., \$100.

Export Discount, 55 per cent.

**FRAMES**—22, 24, 26 inches high; seamless steel tubing, large diameter; reinforced joints, 43 inch wheel base.

**WHEELS**—28 inches, wood or steel rims; piano-wire swaged tangent spokes nicked, barrel hubs turned from bar steel; M. & W. tires.

**BEARINGS**—Dust-proof; large balls; special steel cones, oil tempered; steel-ball races, tempered and polished.

**HANDLE BARS**—Drop, high, Ramshorn, steel or wood; cork grips.

**GEAR**—64, 68, 72, 76, 80; forged sprockets, hardened; Cranks, 6½ inch, forged; Chain, ¼ inch, hardened.

**FINISH**—Black or colored enamel, highly polished; nickeling done on copper.

**EQUIPMENT**—Saddle, pedals, tool bag, tools and tire-repair outfit.

An extra set of Bearing Cones furnished with each Wheel for Export.



ENVOY.

None but expert mechanics employed in their construction.

Absolutely high grade in every detail.

Best wheels ever offered at anything like the price.

Write for catalogue and full information as to terms, etc.

**BUFFALO CYCLE CO, Buffalo, N. Y., U. S. A.**

FLEETWING.



Our Watches and Clocks are known throughout the world as of the highest quality, and our Cycles are of the same grade.

**HOWARD BICYCLES**{ Singles, \$100.  
Tandems, 150.Agents for Great Britain:  
UNION BOOT & SHOE MACHINE CO.,  
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G. H. CLAPP, Johannesburg, S. A. R.**The E. Howard Watch & Clock Co.**

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**HOWARD**

Watches,

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### More Trade with the Orient.

THE efforts that are now being made to extend the trade of the United States with both China and Japan are already beginning to bear good fruit. One reason for this is that both these countries in the Orient are very willing to do their share to increase this trade, knowing very well that they will profit by it as well as the United States. Japan is building new vessels for its trade on the Pacific, and is at the same time opening its markets in such a way as to welcome the products of American factories on terms that insure a fair profit to the exporters.

In line with this concerted effort for the extension of this trade is the bill just introduced in Congress authorizing the appointment of a commission to introduce and popularize the bread foods of the United States among the peoples of the Orient. This bill provides that the commission shall consist of three persons, to be appointed by the President and confirmed by the Senate, and to be known as the Bread Foods Commission of the United States, under the direction and control of the Secretary of Agriculture. The commission is to ascertain, and from time to time report to the Secretary of Agriculture, on the best mode of introducing and popularizing the bread foods of the United States in Oriental countries.

Whether Congress will be convinced that such a commission is necessary to promote this movement remains to be seen, and it may be that an agent of the Agricultural Department or this country's representatives in Japan and China could do the work just as well as a commission of three members, if not better. The measure, however, proves the general interest this subject in now exciting—an interest that must result in an enormous increase in the trade between the United States and the countries of the Orient.

### The Eophone.

THE United States Government has been investigating the properties of the eophone, an instrument about which much has been written, and which is said to be more sensitive to sounds than the human ear. This property is due to its greater area of diaphragm and its ability to gather in and intensify a large number of very feeble sound waves. By means of this novel device, which is placed on top of the pilot house of a vessel, it will be possible to hear sounds from another vessel so far away that any noise that might be made aboard of her less than the report of a shot of a cannon would not be audible to the ear upon the vessel which contained the eophone.

The primary object of the invention is to warn ships by means of fog horns of their approach to dangerous shores or each other when invisible. It consists of a metal plate several square feet in area which acts as a diaphragm to receive the sound waves. Back of this is a resonant chamber which intensifies the sounds, which are listened to by means of ear tubes.

### Paper Rails.

AMERICAN manufacturers are at present experimenting with paper as a substitute for steel for railroad rails. The Germans and Russians have already tried it with considerable success. Of course we have had paper car wheels for a considerable time, and it is believed that railroad rails can be made from the same material and be equally as durable. It is agreed that paper rails would not be affected by atmospheric changes, would not warp or expand and contract as steel rails do, and that the paper rails would be less than half as heavy as the steel ones and could, consequently, be twice as long, obviating the necessity of so many bolts and connections, and consequently lessening the jars that are caused by passing over connections. If paper rails are a success, may we not ask why paper could not be used with equal success in making the framework for buildings?

TWO instruments for the assistance of the deaf have recently been invented.

The contriver of the first is Col. J. A. Lakin, of Westfield Mass., who several months ago patented and placed on the market, where it is meeting with a large sale, a micro-audiphone for use of people afflicted with deafness. He has perfected another instrument on a similar principle for use of theatre, opera, church and lecture goers. The name of opera-phone is given it and it is designed to take the place of an opera glass or lorgnette. With it a whisper can be heard 200 to 300 feet and makes seats remote from stage or platform or pulpit as desirable as those near the speaker, actor or singer. For people whose hearing is in any manner impaired it will prove a great boon. There is no cushioning of sound waves, such as is created by a seashell, the instrument being constructed of such material as to avoid metallic sounds, but giving articulate speech and musical sounds in a natural but intensified tone.

The second has been patented by William L. Skinner, a St. Louis inventor. Mr. Skinner is a civil engineer, but of late he has been devoting his time to inventions. The electrical ear drum is his latest. If Mr. Skinner's invention will do what he claims for it he has wrought an everlasting benefit to those who are hard of hearing. His ear drum, he says, is so constructed as to be almost invisible after it has been placed in the ear of the wearer. The drum consists of an electrode contact plate and an elastic receiver, designed somewhat on the principle of the telephone, but much more delicate. When once placed in the ear no further adjustment is necessary. To the portion of the device inserted in the ear is attached a wire so small as to be scarcely visible. This wire leads to the battery, which may be carried in any pocket desired. It is possible, the inventor says, for the wearer to hear an ordinary conversation anywhere within a reasonable distance.

### Utilizing Coal Dust.

ASIDE from patented devices for feeding coal dust to boiler furnaces in a normal state, there have been numerous patents granted within two years past for an artificial fuel, in which this vast by-product of the mines furnishes a greater or less component. It is now announced that a syndicate has purchased a tract of land containing ten acres on the left bank of the Schuylkill River for the purpose of erecting thereon a plant for the manufacture of coal-dust briquettes for fuel. Under the process contemplated the coal dust is treated with certain chemicals, without the use of pitch or resin, which made the older processes so objectionable. Under enormous pressure the dust is compressed into hard blocks or cubes of suitable size for consumption. All through the coal regions there are banks of coal dust piled mountains high, the residue of years of mining operations. This will be brought to the factory by rail and river navigation. The plant will have a capacity of 1,600 tons of finished product per day.

### A New Clock.

A CHICAGO man has invented a clock which, he believes, will run for forty years with one winding. It has a small 6-inch dial in the top, and is wound with seventeen twists of the key.

"Forty-three years six months and some days it will run without ever being removed from beneath that case," declares the inventor, "and it is the only clock of its kind in the country."

He claims that a force of 175 pounds is brought to bear upon the centre-post, an expenditure of forty pounds in transmitting the power to the next cog wheel and a proportionate diminution of power on each succeeding cog is followed down to the almost infinitesimal balance wheel, where the force exerted is less than the hundredth part of an ounce.

The clock has been running now above a year and has never been touched save to undergo a slight regulation during the first weeks.

### Japanese Papermakers.

S. K. YASUBA, of Tokio, Japan, has been in this country for the past few weeks arranging for the purchase of a large equipment for a paper mill in Kuinamoto, in the Western part of Japan. Having learned the trade of paper making at South Lee, Mass., ten years ago, Mr. Yasuba proposes to introduce American methods in his own country. He has organized a company bearing the name of Tohiseishi Kaisha, and it is proposed to manufacture paper out of rice, straw and ground wood. The Japanese mill will be equipped with two 100-inch Fourdrinier machines, five 1,000 pound and two 1,200 pound beaters, three Jordans and four rotary boilers. The power will be supplied by steam and the mill will be lighted by electricity. Although the Japanese are not loath to profit by American ingenuity in the manufacture of book and news papers, they turn out papers of their own which are unrivaled for fineness and softness of texture.

A TRAVELLER who has recently returned from Europe reports that the idea of organizing in Russia an exhibition of American products met with the heartiest sympathy on the part of the Russian Government and commercial circles. Interviews with representatives of the Russian press show that, foreseeing in the direct commercial connections a mutual benefit for Russia as well as the United States, the Russian papers will give a strong support to this enterprise. The idea of an American display is founded upon the fact that practically no direct relations exist between the two countries, and what new American goods are imported into Russia, are through German or English agents. The late exposition at Nijni-Novgorod proves, the traveller argues, that Russia has awakened from her long sleep, and in all her territory there is now noticed active work toward using her natural treasures. A good supply of samples and specimens of American products established in various commercial points will enable the manufacturers to follow the requirements of the market and to work against the foreign competitors. In view of the necessary preliminary work it is proposed to open the said exposition in 1898.

A NEW spectacle frame has been invented by Frederick A. Stevens, of Providence, R. I. The improvement is in the construction of the joint piece connecting the temple-arm and the eye frame. The joint pieces are formed by striking up a cup-formed shell and a filling piece, which enters the covering shell and is provided with a rabbeted edge. The filling-piece is to be placed in a shell and the edges of the shell turned upon the edge of the filling. The outer part of the surface of the filling-piece is depressed and a corresponding portion of the edge of the shell is cut away or made lower, so that when the two joint pieces are placed together a space will be formed between them to receive the perforated ear of the temple-arm. After the shell has been secured to the filling-piece a notch is cut in its edge to receive the eye frame. The shell may be made of gold or gold plate and thus effect a saving in the cost of gold bowed spectacles, the shell being secured to the base metal filling piece by being pressed inwardly over the edge.

AT a London dinner recently given by Mr. William Waldorf Astor some guests smiled incredulously at what their host said about the size of the California redwoods, and Mr. Astor promptly wagered that he could obtain a cross section of a tree large enough to make a table for the forty persons present. As a consequence the ship Maria Hackfield has sailed from San Francisco with a cross section of a redwood consigned to Mr. Astor which is 14 feet 6 inches in diameter and weighs nineteen tons.



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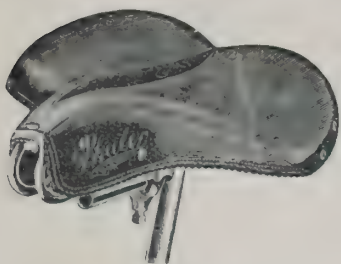
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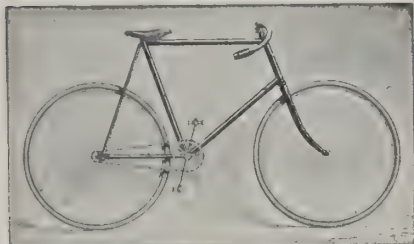
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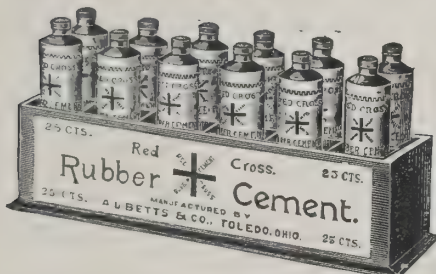
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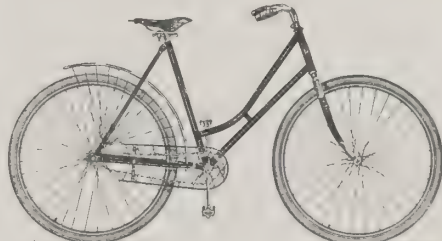
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## Miscellaneous Notes.

—A blast furnace has recently been established on the Austrian coast near Trieste. Most of the machinery was made in Milwaukee, Wis.

—A machinery exhibition will be held in Munich, Bavaria, from June 1 to October 10, 1898, to which manufacturers of motors and machine tools of all countries are invited.

—A Venezuelan shipper says that the demand for American made shoes is increasing. "The mails of the last month have," he says, "brought the best orders that have been received in the market this year."

—A correspondent writing from Gadsden, Ala., says: "The Dwight Cotton Mill made a big shipment of cloth to Marseilles, France, last week, and more is to follow. These shipments are made nearly every week."

—An American company which had shipped two 15x22 double-end locomotives to the Naniwa Railway in Japan last October received answer recently to the effect that the first engine had been set up and a trial trip made, which was perfectly satisfactory.

—A considerable amount of match block is being exported to Liverpool. It is destined for various parts of England and the Continent. It will be turned into matches by the machinery of the Diamond Match Company, whose plants have been adopted by many of the European corporations.

—There are now running in the city of New York some handsome modern delivery wagons with rubber-tired wheels, which have for side lights, instead of oil lamps or candles, bright little incandescent electric lights, and they carry also an electric light inside instead of the usual lamp or lantern.

—John F. Brouger has patented a shoe polisher which he holds to be a great improvement over the old style of a brush. It consists of a block of wood over which is stretched a piece of flannel cloth or any other such material. Used in the same manner as an ordinary blacking brush it produces much better results.

—It is reported that several of the leading wall-paper manufacturers are looking into the possibilities of increasing their export business. They claim that they can easily compete with the French manufacturers, who, thus far, have enjoyed the bulk of the export business, particularly in the South American continent.

—To save the housewife the bother of having to watch the pot boil an ingenious person has conceived the idea of applying the alarm clock principle. An escapement actuated by a spring is inclosed in a metal case with a dial and mechanism for sounding an alarm at a predetermined time. The apparatus forms a part of the utensil.

—It is stated that Alexander Kelly, Wilmington, Del., has invented a machine for making matches that turns out the enormous quantity of 8,000 matches a minute—a capacity much greater than that of any other match machine. It is 45 feet long and of solid but simple construction. The quality of its product is said to be unsurpassed.

—Telegraph and telephone poles are the latest development in the line of manufactures from paper. They are made of pulp in which a small amount of borax, tallow and other ingredients are mixed. These are cast in a mold in the form of a hollow rod of the desired length. The poles are claimed to be lighter and stronger than wood, and it is said that the weather does not affect them.

—The Shoe and Leather Fair now being held in London is of interest to the trade in this country by reason of the many American shoe machines exhibited there. A Boston manufacturer remarked the other day that the world is coming to Boston for shoe machinery. He might have added that the few who do not go there are familiar with American shoe machines by seeing them exhibited abroad.

—Doors opened and closed automatically by electricity are the latest application of this wonderful agent. The city market in Springfield, Mass., has recently been fitted up with doors of this kind, the circuit being closed and the doors opened by the pressure of the visitor's feet on the mat. After the visitor has passed through, the doors are shut by the same current and left ready to open at the next visitor's call.

—A convenient form of electric hand drill has recently been devised. The feature of interest is its portability and the fact that it can be used in any position. Its advantages in shipbuilding are great. The drill will bore holes up to  $\frac{3}{8}$  of an inch in diameter and weighs 46 pounds. From experience it has been found that while eight holes per hour can be drilled by hand, thirty-five holes can be drilled in the same time with the electrically driven drill.

—A Tacoma, Wash., paper says a machine shop in that city is building a sawmill outfit which is to go to Delagoa Bay, South Africa. Heretofore much difficulty has been experienced in getting Puget Sound timbers at that place which are cut to the desired lengths and sizes, and it is the intention to build a mill there which will handle again the products of the Washington mills. The contract for the mill is said to amount to something like \$100,000.

—A Floridian has patented a device for an automatic beacon which would render the post of a lighthouse keeper a sinecure or do away with it altogether. Automatic mechanism is to light and extinguish the light at given hours, clean and wipe the globe, trim the wicks and maintain the level of the oil in the reservoir at the proper height. The entire mechanism is propelled and controlled by clockwork, which only needs to be wound up occasionally.

—A 162-inch papermaking machine is under construction for the Rumford Falls Paper Company, of Rumford Falls, Me., says the *Baltimore American*, which is undoubtedly the largest in the world, having a 60 foot wire, gun metal

breast roll, 24 inch gun metal coupler, 24 inch press roll, 28 48 inch driers, besides press and receiving driers, and a stack of 12 chilled calendar rolls, reel and winding machine, the speed being from 300 to 500 feet per minute.

—Another practical use for asbestos has been devised by a Yankee, who has converted it into shoes for the use of workmen in foundries and smelting works. In the intense heat of these factories ordinary leather, hobnailed shoes, such as are generally worn, last but two or three weeks. Shoes of asbestos are not affected by the heat and seem practically indestructible. The wonder is that the availability of the material had not previously suggested itself to any one.

—One of the sources of economy resorted to in recent years is the use of the gas engine in small carriage shops. The small shop with a gas engine can run and make a little money at times, when the big factory with a steam engine cannot pull through. With the steam engine, the remedy is to stop when business falls below a certain volume. With the gas engine, hard times and dull trade make less impression. The field for the gas engine is steadily improving from this cause.

—A new rotary engine, the invention of J. A. Goodner and J. M. Chritton, Mosca, Col., and which promises to prove a success, is undergoing experimental tests at Creswell's machine shop, at Denver. The engine has three pistons, disks and rotary valves, all controlled by one throttle or reverse valve. It develops a speed of 1,500 revolutions per minute, and with 100 pounds boiler pressure gives about 4 horse-power, and can be started and reversed instantly with one lever.

—The manufacturers of Europe, and particularly those of Great Britain and Germany, are anticipating and preparing for a hard struggle with their American competitors. The notable increase of American exports of manufactured products during the last two or three years and their popularity abroad have warned foreign makers that their supremacy in the markets of the world is threatened and aroused them to the necessity of putting forth every effort to maintain their position.

—The old question of stamping as such all foreign meats shipped into England is on the tapis once more, through an inquiry now being made by a select Parliamentary committee of the House of Commons into the operation of the British Merchandise Marks act. No matter what turn or twist is given to this law affecting the sale of American meats in England, the fact is now undisputed that American beef, whether sold as such or as of domestic production, as regards quality is second to none.

—On June 26th an important engineering exhibition is to be opened in Sydney, New South Wales, to remain open during the months of July and August. It is intended to embrace engineering in all its branches, and the exhibits will consist of raw materials, manufactured articles, machinery and models, drawings and photographs of all kinds relating to scientific, mechanical and educational works, in classified sections. The object of the exhibition is the advancement of engineering science and the promotion of a general and practical education therein.

THE steamship "American," which sailed from Brooklyn on May 3d, is reported to have taken the largest general cargo ever shipped from this country to South Africa. The "American" carried more than 11,000 tons of freight, including about 80,000 bushels of grain and a large and varied cargo of machinery and manufactured goods, including mining machinery, engines, stamp mills, agricultural machinery, wagons, trolley and electric light plants, trolley cars, bicycles, etc. The cargo is consigned to Cape Town, Port Elizabeth and Delagoa Bay.

THE export movement in California dried fruits has, it is reported, been steadily extending during the past two years. The direct shipments from the coast to England and the Continent aggregated eighty-five cars of dried fruits on through bills of lading, which, together with what has gone out from Eastern ports, made a total to that time of about 170 cars. California, it is reported, intends to make an elaborate exhibition at the Horticultural Exposition in Hamburg, which will begin on May 1st and last for five months.

R. E. REED, of Michigan, has made an invention, which, he expects, will revolutionize the basket-making industry. It consists of a machine, wholly of iron, which weighs 3,000 pounds, which can be operated by one man and a boy, who can make as many baskets as four men by the old hand process. Besides, it is claimed, the machine turns out a much better basket than can be made by hand. In the place of nailing, it fastens the hoops with strong flat wire staples, driven two inches apart and clinched on the inside.

J. S. HILLMAN, of Homestead, Pa., U. S. A., has taken out a patent for an automatic gate. It is of the slide pattern and works without either latch or hinges. It is operated by weights and pulleys hidden in the main post, through which the gate slides back and forth upon small rollers. When pushed open the gate closes itself and is held in position by weights. It can be manufactured of any material and is said to be as serviceable with a rough fence as a finely built wall.

A LEADING office furniture manufacturer claims that during the last year the best export customers they had were European firms. To England alone their business on roll-top desks has been satisfactory. At present they claim to have an order on hand for the Australian market amounting to \$23,000 for office furniture alone. This order will be shipped in two or three lots, according to the dispatch with which the goods can be turned out.





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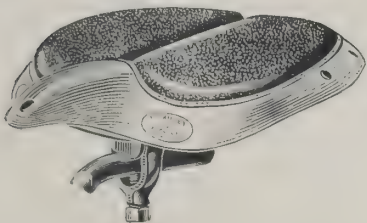


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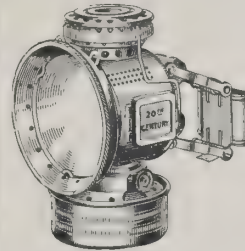
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List Price,  
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The bottom of this seat is made of light material; the sides and back are of rattan, beautifully woven and mounted on a double steel wire spring clamped rigidly to handle bar post, with a movable foot rest. The seat is covered with a nice cushion, making a very beautiful and easy riding seat for a child. See this seat and you will have no other.



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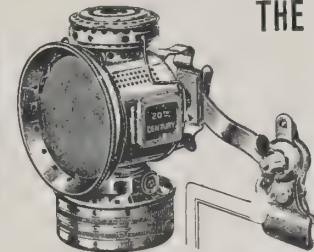
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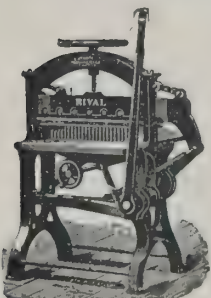
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The cutter is also furnished with a finger gauge for cutting stock within half an inch of the knife, without extra charge. The capacity of each cutter is one-fourth of an inch larger than stated above. Each cutter is provided with a regular back gauge of sufficient length to enable small work to be squared with both back and side gauges. Write for circular and prices of the Rival Power Paper Cutter. Order through any reliable commission house; always send duplicate of order to us.

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Tobacco Granulator No. 3 (Hand Power).....	\$160.00
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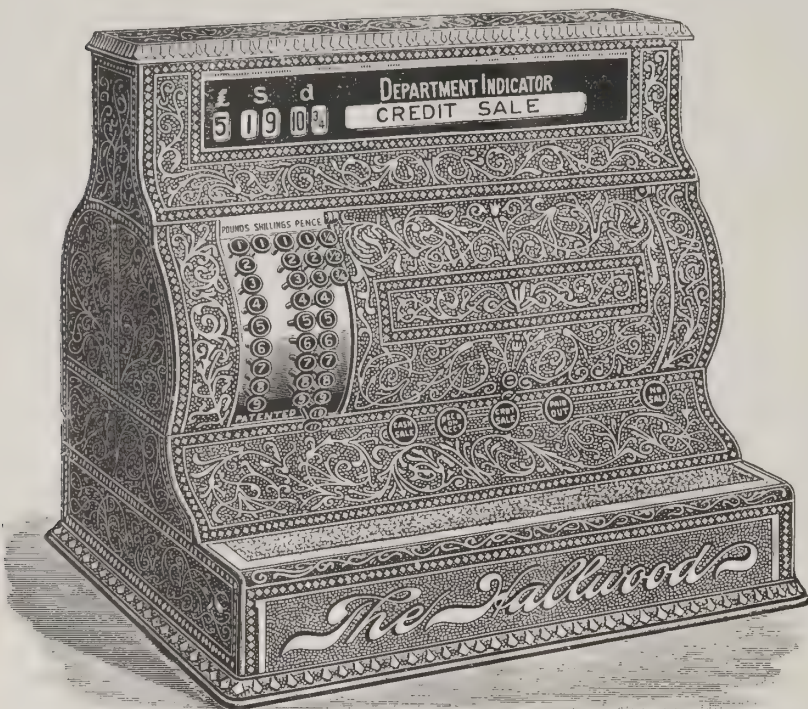
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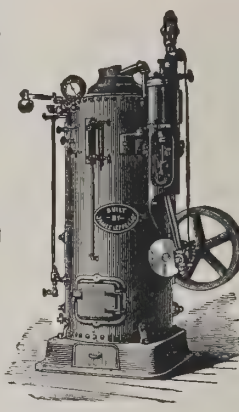
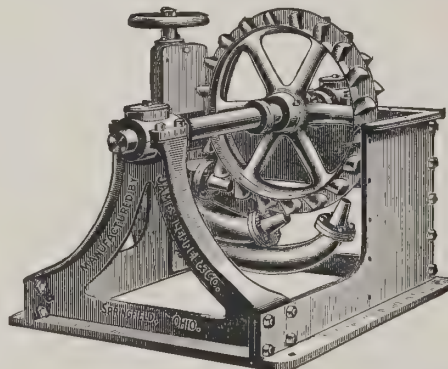
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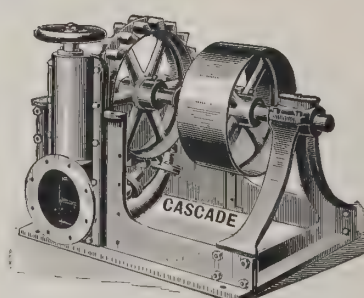
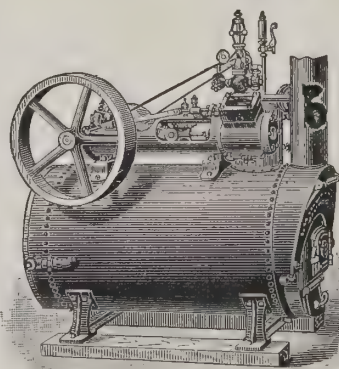
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From 2 Feet to 2000 Feet.



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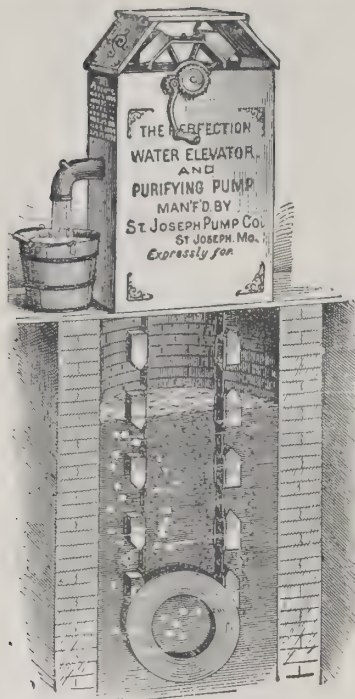
SPRINGFIELD, OHIO,

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# THE WORLD-RENOUNDED Perfection Water Elevator and Purifying Pump

A Sure Preventive Against Malaria, Typhoid and Other Fevers.

## THE EXACT PUMP FOR YOU.

### HOW DOES IT PURIFY?

This Pump is guaranteed to purify the foulest water in well or cistern in 10 days' ordinary use.

Each bucket descends full of air and ascends full of water. For each gallon of water drawn a gallon of air or oxygen (the vital element) is circulated through the water from the bottom to the top. This not only thoroughly agitates, ventilates and purifies the water, but also forces a large supply of oxygen which is sufficient to consume all impurities or organic matter in the foulest water. It is an admitted fact by thousands using them that this Purifier is the only Pump that will destroy wigglers, water bugs and water lice, and make foul or stagnated water pure and sweet, removing all color, bad taste and smell. After a few days' usage of the "Perfection" the old flatness and insipidity in water are replaced by a sparkle like that of a mountain stream. In fact, it will make bad water good and good water better.

Our No. 6 Perfection (family use), all complete, with chain, for 17½ ft. well or cistern	\$17.00
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For wells or cisterns of greater depth (family), chain per single foot	30c.
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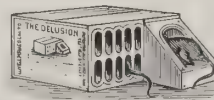
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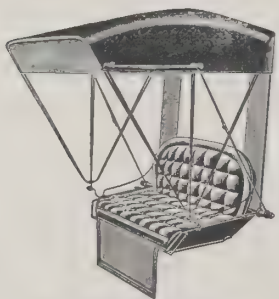
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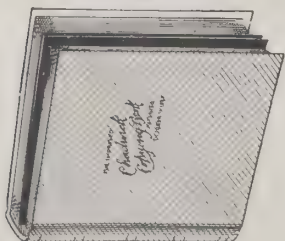
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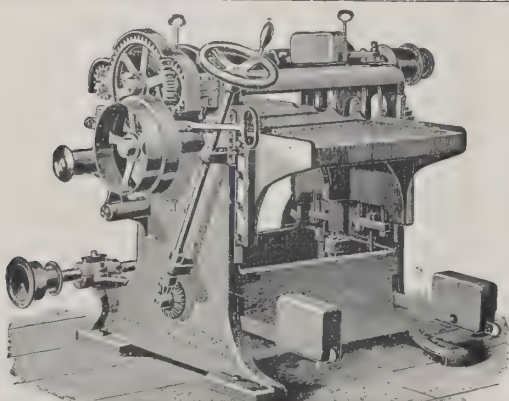
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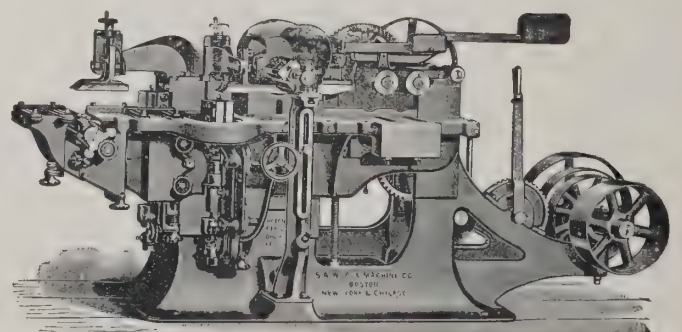
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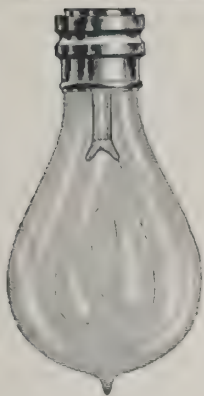
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Works 4 sides, 7, 8 or 9 inches wide. Weight, 3,000 lbs.

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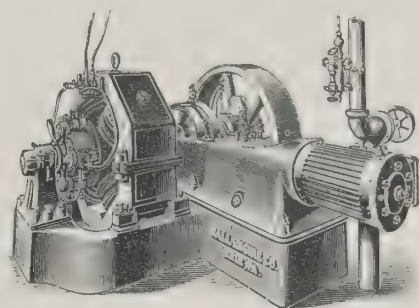
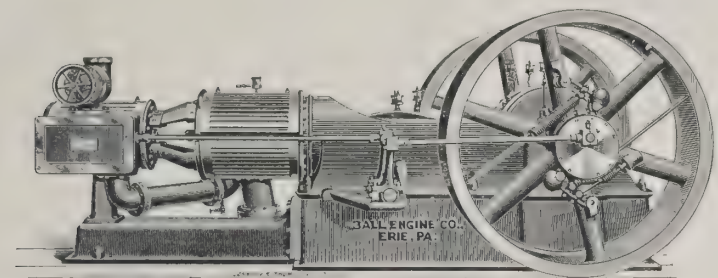
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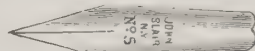
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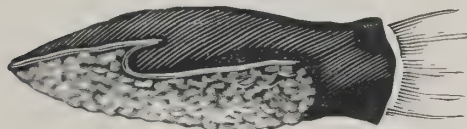
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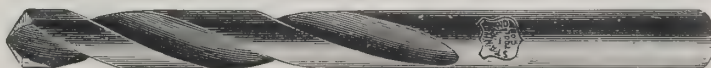
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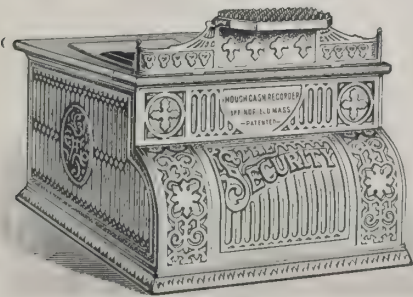
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If so, how often have you forgotten to "put down" money paid out?

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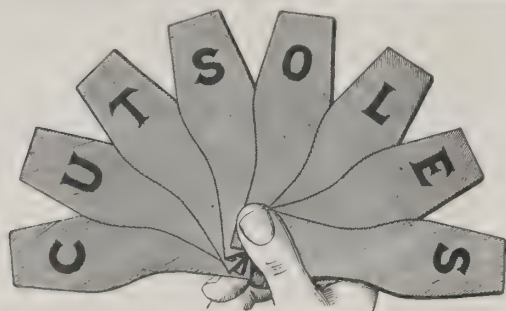
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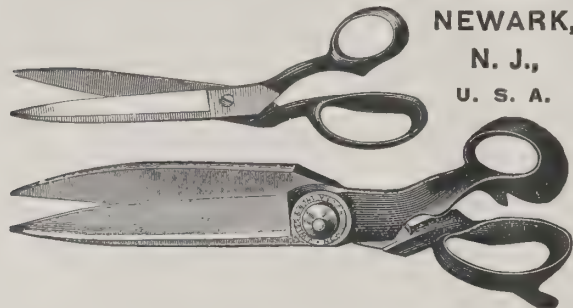
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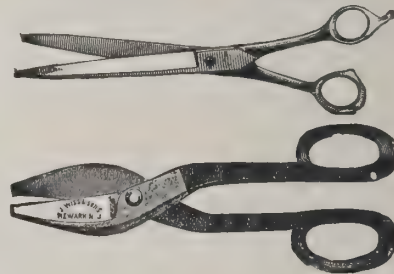
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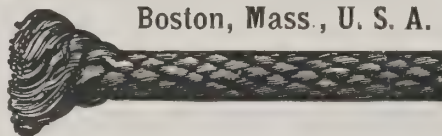
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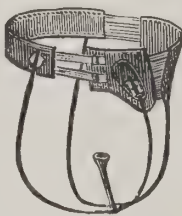
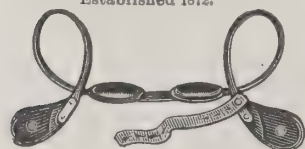
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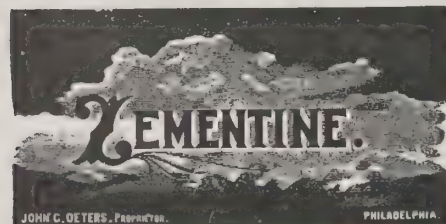
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IT IS AS CHEAP AS WHITEWASH AND FAR SUPERIOR.

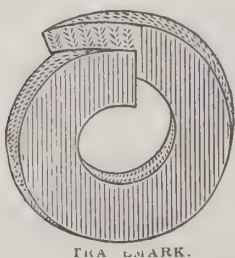
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Less friction than any other known Packing. Never grows hard if directions are followed. Does not corrode the rod. EVERY  
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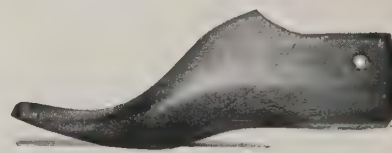
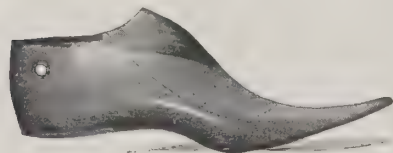
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Holders made of best Para Rubber, Pens 14 carat fine. Export orders a specialty. All goods  
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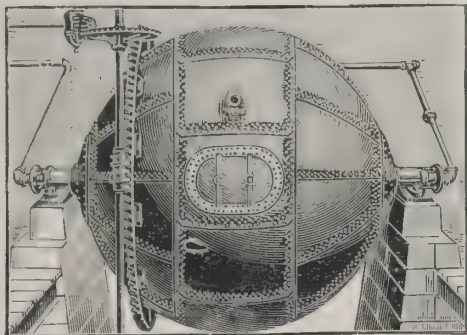
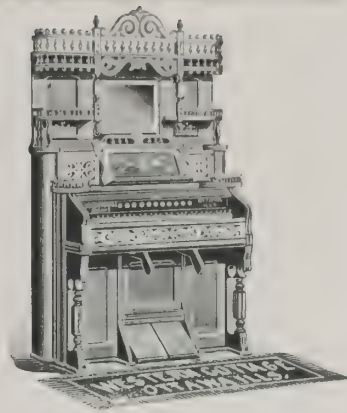
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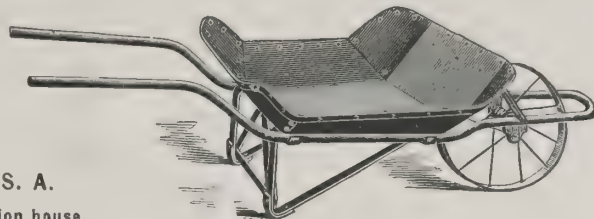
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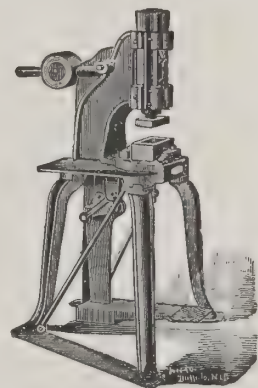
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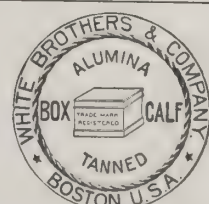
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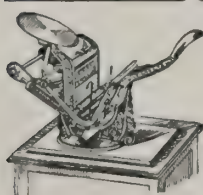
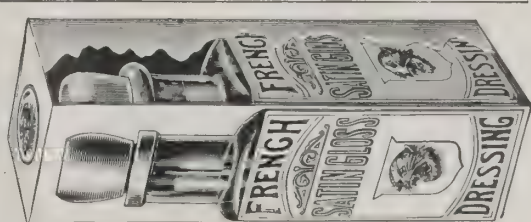
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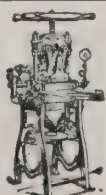
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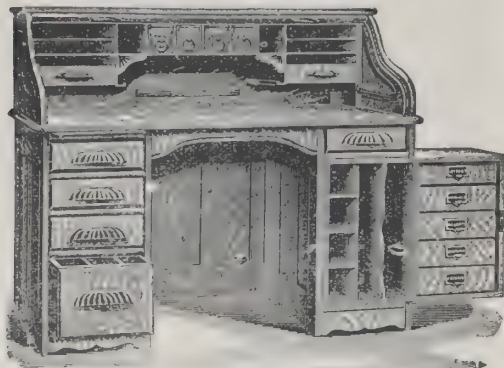
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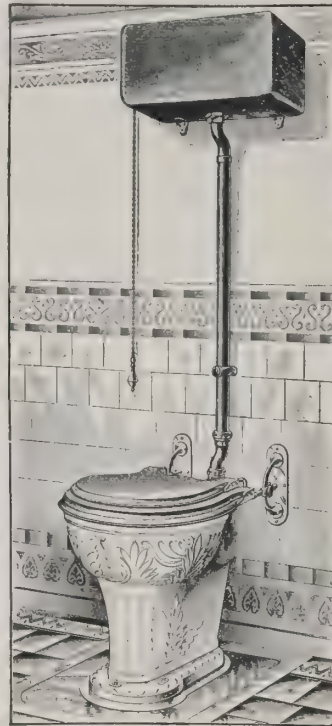
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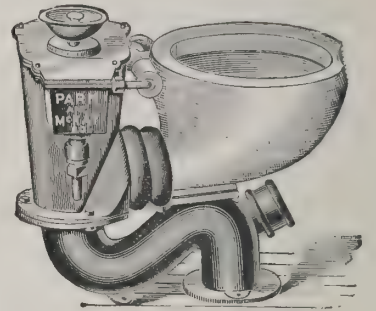


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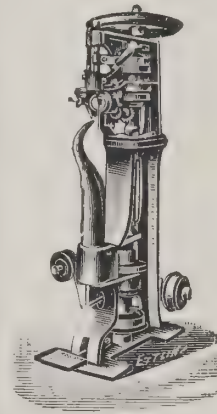
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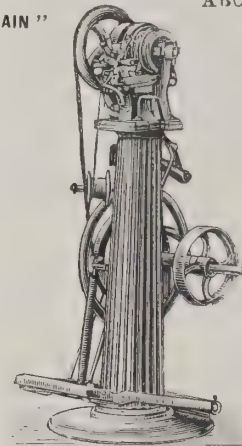
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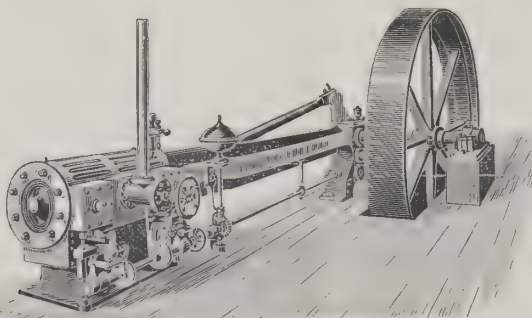
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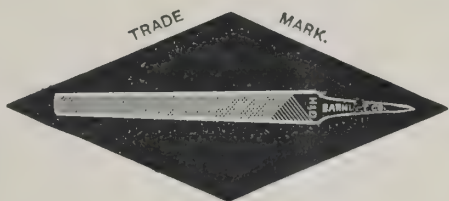
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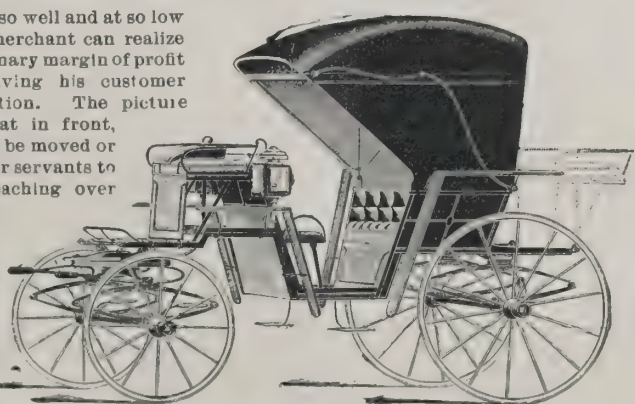
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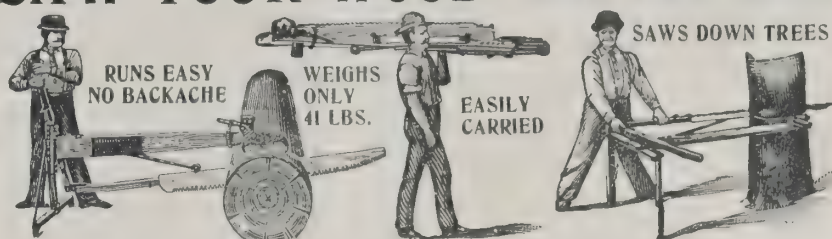
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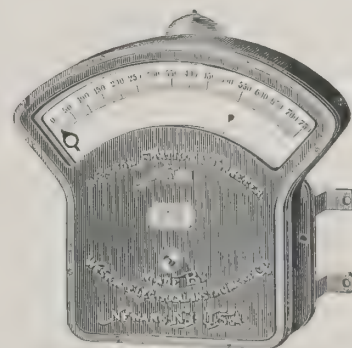
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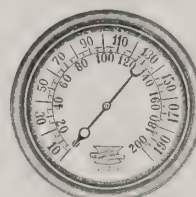
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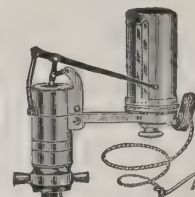
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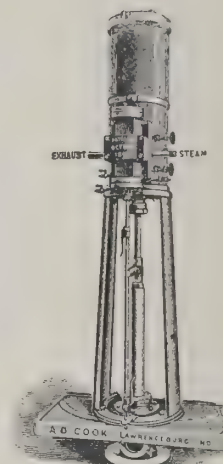
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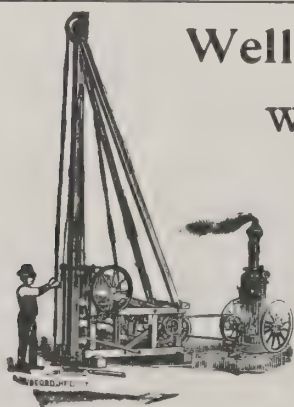


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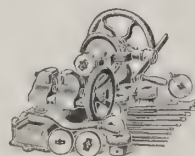
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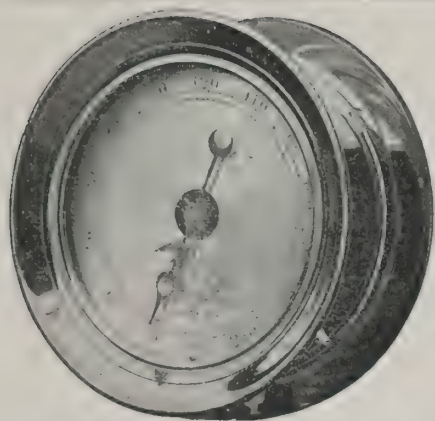
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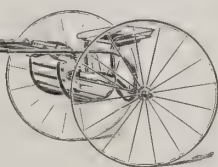
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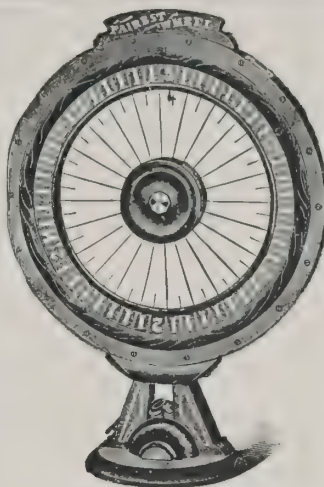


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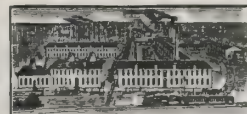


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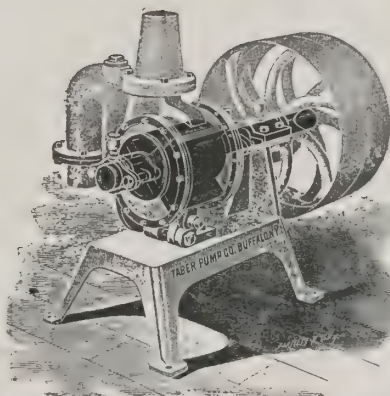
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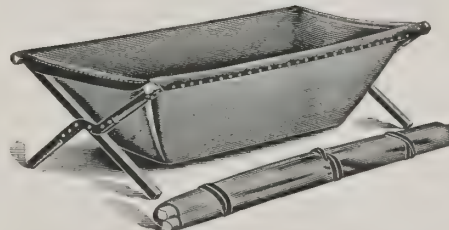
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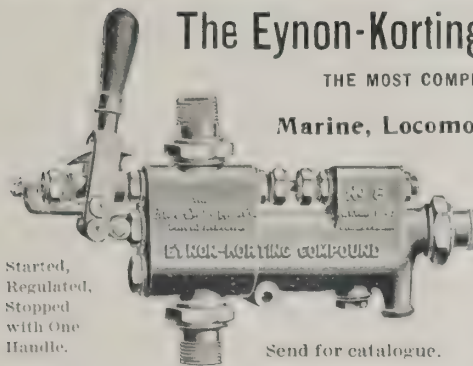
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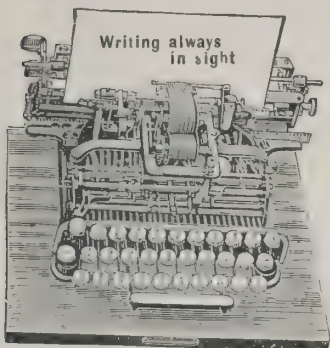
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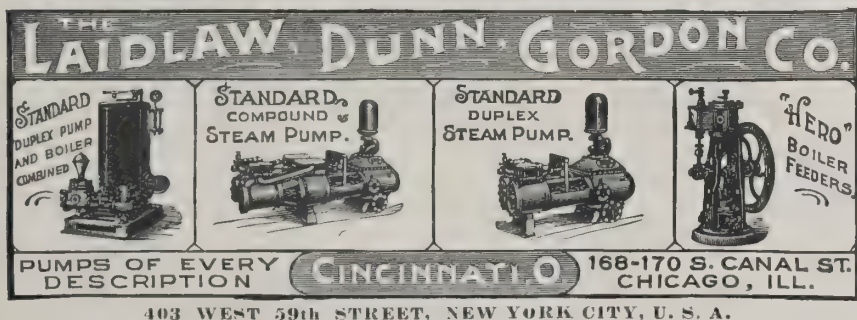
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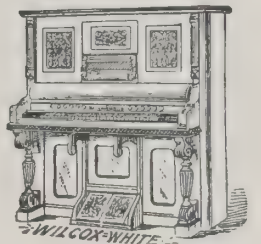
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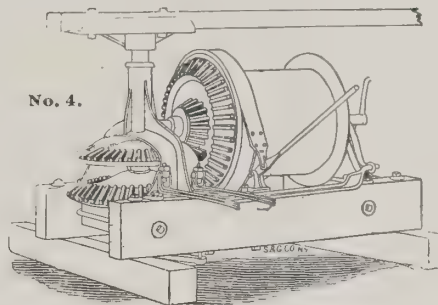
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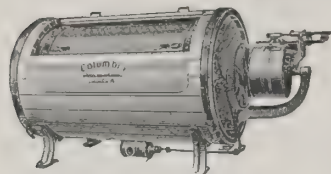
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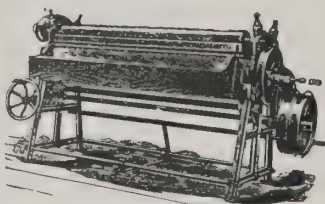
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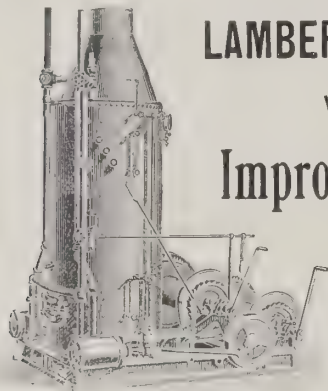
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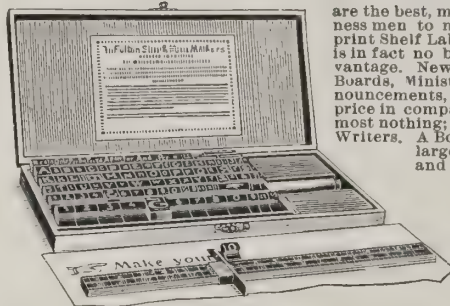
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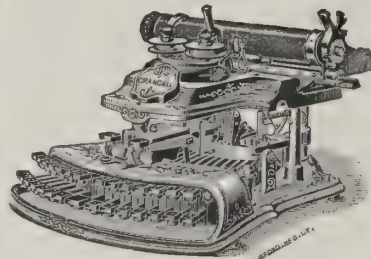
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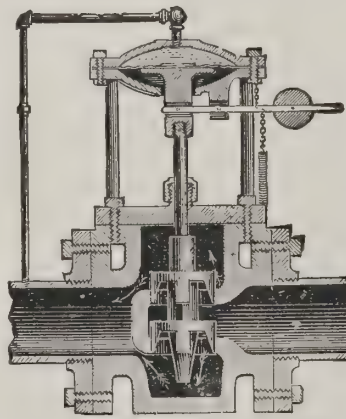
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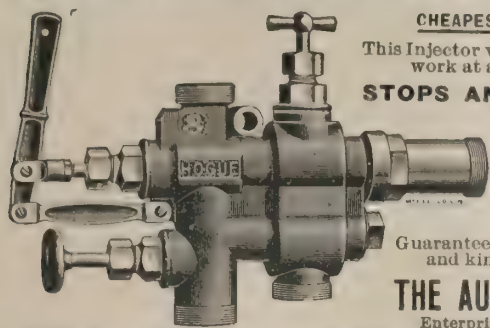
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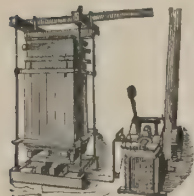
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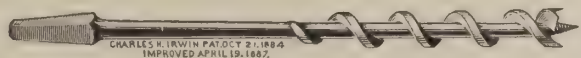
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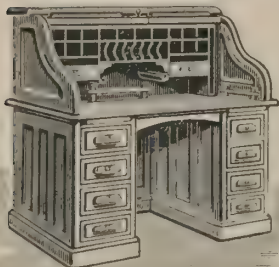
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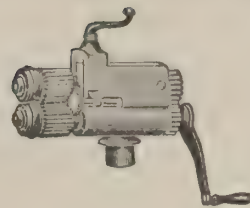
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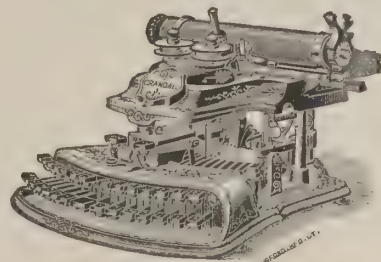
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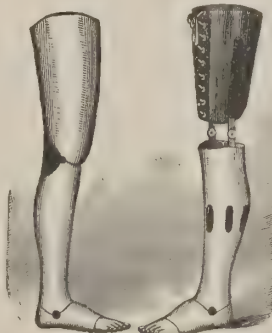
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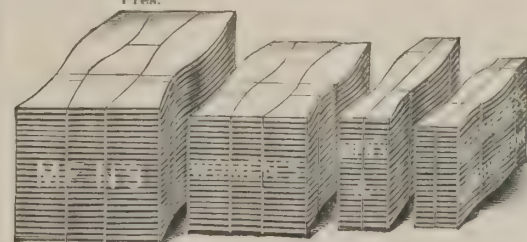
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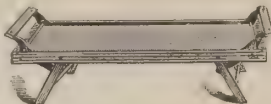
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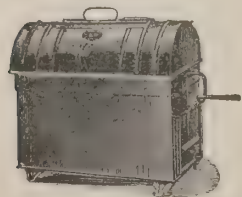
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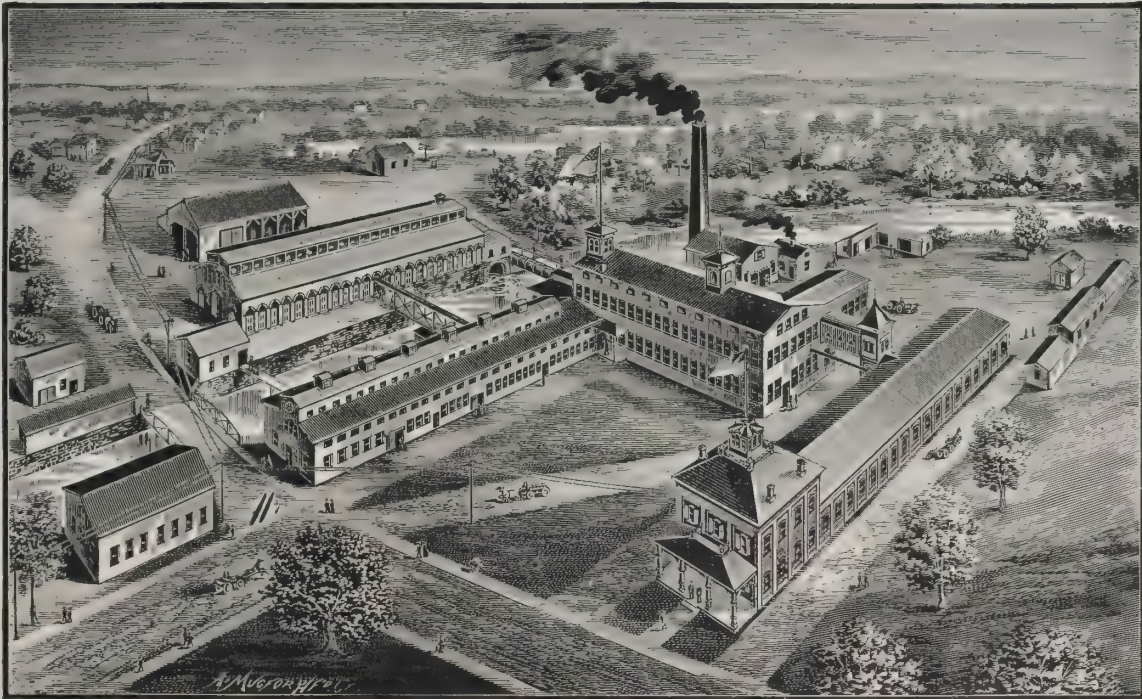


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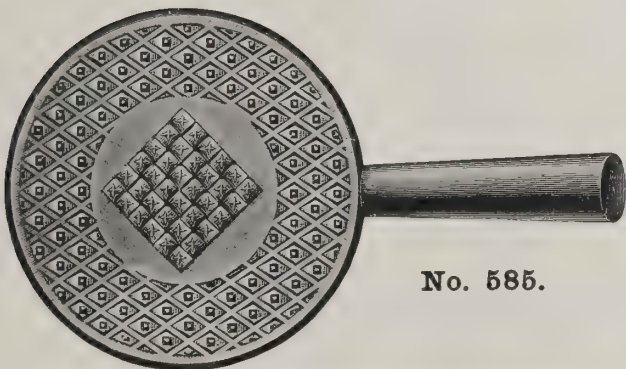
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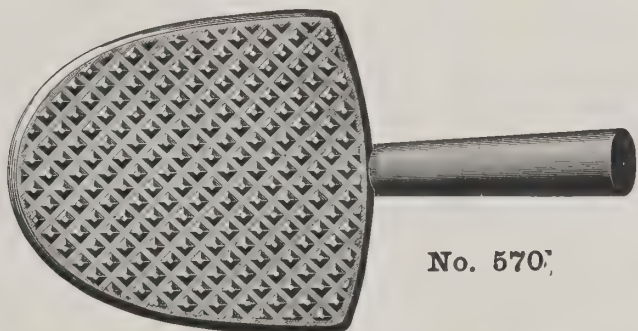
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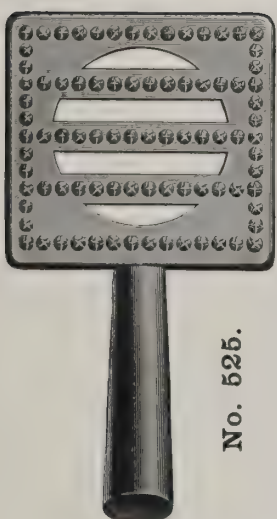
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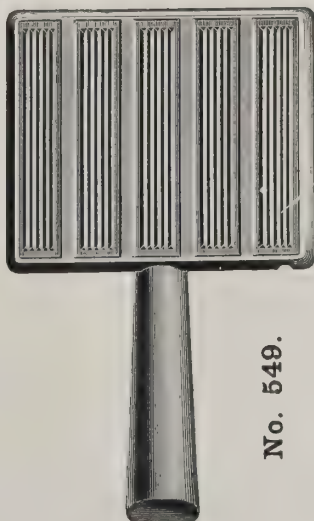
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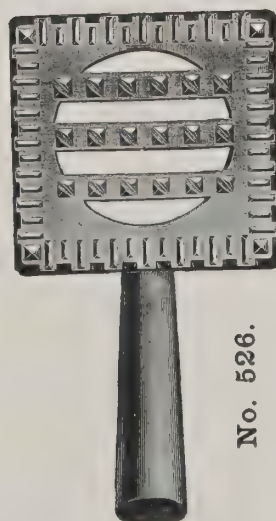
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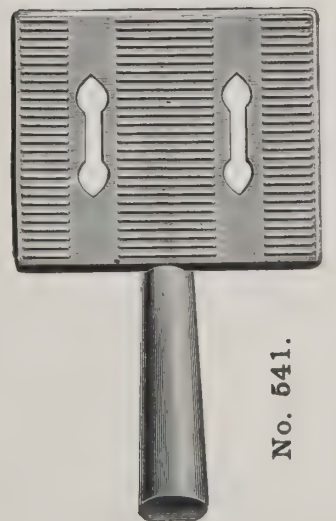
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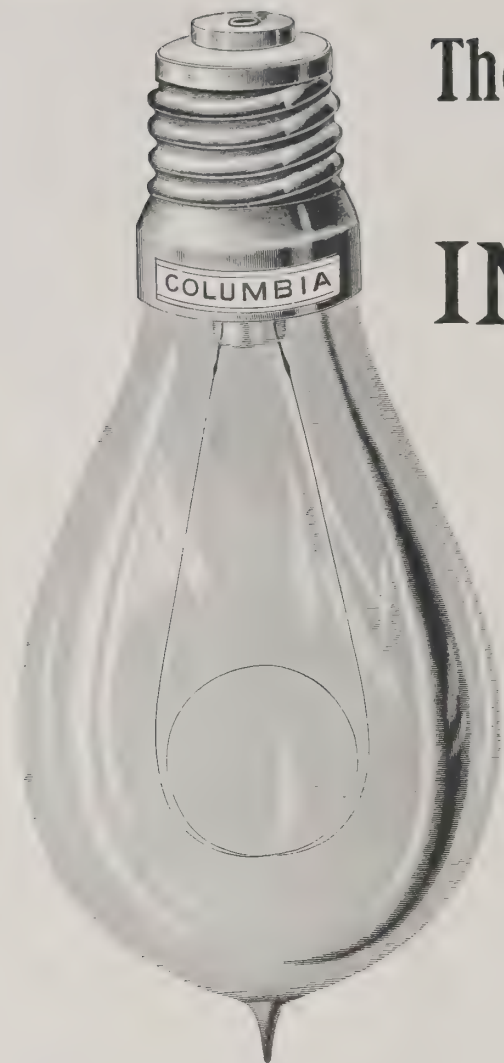


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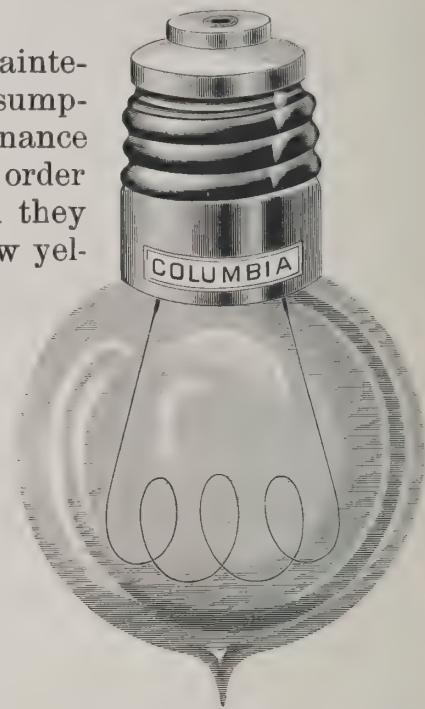
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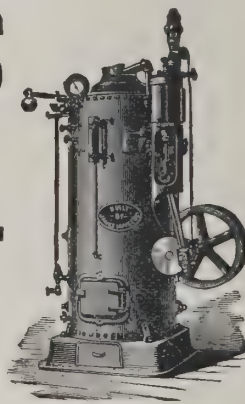
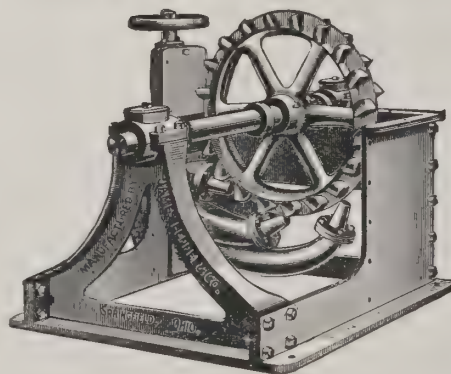
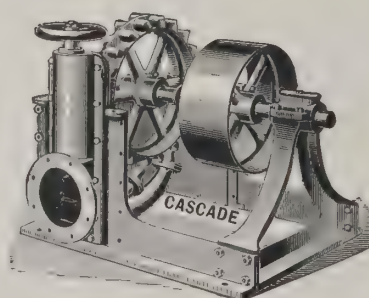
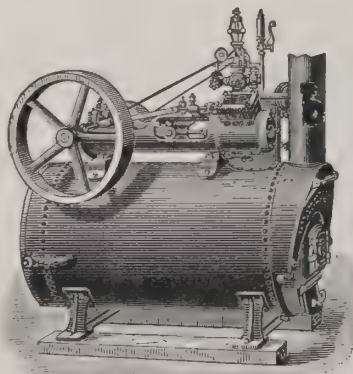
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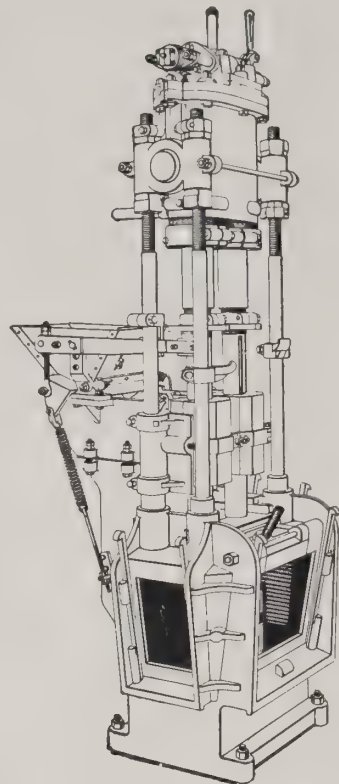
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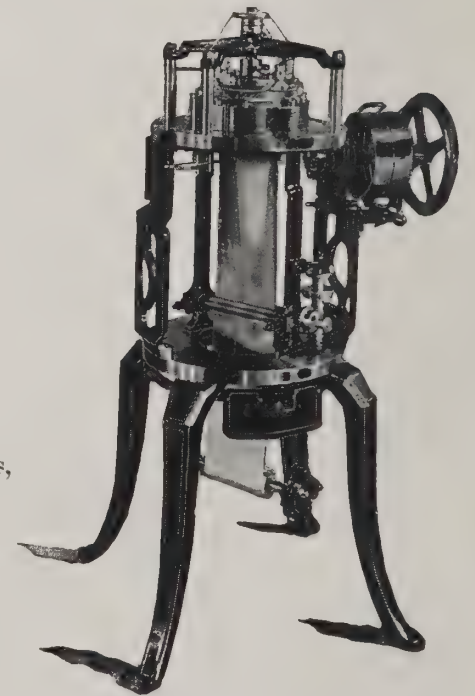
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IT is improbable that any sixty years of the world's history covers an era of such great and diversified progress as the period during which Victoria has reigned Queen of the United Kingdom and Empress of India. This Victorian age is not as remarkable for the achievements of statesmen, poets, artists, armies or navies as for the discoveries of science and the developments of industry and commerce. If nothing more is considered just now than the changes wrought by steam and electricity the telling of the story transcends in interest and import for good anything recorded in the past.

When Queen Victoria received the sceptre, measuring by time required for the passage, the United States was six times further from London than it is to-day. India was forty days distant instead of fourteen, and Australia six months instead of six weeks. The power to transport persons and commodities in a constantly diminishing period of time has made Englishmen and English manufactures familiar guests in all the world's markets. The conquests of English trade have added more to the strength of England than the conquests of English arms. No nation has used so liberally, or so wisely, the improved instrumentalities for manufacturing or distributing products as England. No nation has been the pioneer in as many uncivilized countries and held with as unyielding a grasp every advance made as England. The history of the growth of her empire and her commerce shows results not to be found in the records of any other nation.

While during this sixty years of the Victorian age transportation facilities have drawn the world into a compact unit over which trade can spread with less difficulty than it could through a single country at the beginning of the period. The means for the dissemination of knowledge have improved in a still more wonderful manner. By the use of the electric cable the revolving earth is outdistanced. Messages from India are delivered in London hours before the clock keeping sun time can record the instant of starting. To-day all news of international importance is practically reported simultaneously over the world. Steamships fly like shuttles from port to port on every ocean, carrying the material of commerce. Cables join shore to shore, causing continents and the islands of the sea to touch and instantly reveal the knowledge which guides trade. All nations are being woven into one vast human family that can cordially acknowledge the beneficence of sixty years of progress during the reign of Queen Victoria.

### AMERICAN EXHIBITION IN CARACAS, VENEZUELA.

THE National Association of American Manufacturers has secured desired concessions from the government for the city of Caracas, Venezuela, and will now establish in that city a permanent exhibition of American manufactures. The purpose of the association is to stimulate the interests of Venezuelan merchants in American goods, to give them an opportunity to examine the goods themselves before making purchases and to obtain from a reliable source all desired information concerning articles manufactured in the United States.

The exhibition will be under the management of the association, and in charge of its own representatives and employees. It is not the purpose of the association to transact business on its own account as a trading company. Its functions will be limited to advertising manufactures and exhibiting samples, leaving the Venezuelan merchant free to place his orders with American export commission merchants or direct with the American manufacturer, whichever course may be best suited to his purpose.

All of the preliminary arrangements for this exhibition have been made by Mr. Rudolf Dolge, who spent several months in Caracas for that purpose. The enterprise will be placed under his management, and he will become the resident representative of the association in Venezuela.

This is a move in the right direction. Every effort to promote trade necessarily proceeds on the well-known lines of making buyers

acquainted with what sellers have for sale. The entire effort of commercial travellers, agents of every kind, of all circulars and advertising, is to reach buyers with information that will cause them to buy the goods offered. It is obvious that the most effective information is given by exhibiting the article and making intelligent explanations concerning its material, manufacture and uses. It is as desirable to bring the buyer to the manufacturer as it is to bring the manufacturer to the buyer, but not so feasible, therefore it is a sound trade axiom. The place to exhibit goods is where they are to be sold. We are glad to see the National Association of American Manufacturers taking this eminently wise and practical step.

### THE REMARKABLE GROWTH OF AN AMERICAN INDUSTRY.

IT sometimes occurs that a dry statistical statement is more intensely interesting than the most thrilling pictures of the imagination. The transformation of a continent from barbarism to civilization, such as was effected in America during the nineteenth century, and will be effected in Africa during the twentieth, transcends the flight of the imagination. Between the conditions under which the American aborigine lived and the comforts and enjoyments which are the heritage of the American citizen of to-day there is a vast difference; and this is entirely due to industrial development; the same natural resources have always existed, but to the aborigine their virtues were hidden. We of to-day have learned to apply them to the use of mankind.

There are few persons capable of looking forward and conceiving that at the end of the twentieth century men will look back 100 years just as we do now and note with satisfaction the improvement in their condition over that of their ancestors.

Everything depends upon the progress of intelligence in utilizing natural resources. This fact is graphically illustrated by the growth of the tin-plate industry in the United States. Ten years ago it did not exist, or at least its magnitude had not marked a development sufficient to give it a place in industrial statistics. Since then a simple statement of its progress is sufficient to excite wonder as to the limits of its possibilities. The production of tin plate in the United States is given as follows:

Year.	Pounds.
1892.....	14,000,000
1893.....	100,000,000
1894.....	139,000,000
1895.....	194,000,000
1896.....	307,000,000

Ten years ago but 1 per cent. of the tin plate used in the United States was of domestic production. Now nearly 60 per cent. of the total consumption is produced in the country. At the same time the cost of the product to consumers has been reduced to a fraction of the price paid for the imported article before the American product became a formidable competitor. The number of tin-plate works in the United States is given as follows: 1891, 4; 1892, 20; 1894, 56; 1896, 69 and four in course of erection.

### INTERNATIONAL ARBITRATION.

READERS of THE AMERICAN EXPORTER in foreign countries may wrongly infer that the failure of the United States Senate to ratify the treaty of arbitration negotiated by a former administration between the United States and England is a disapproval of the principle of international arbitration by the people of this country. To reach such a conclusion would be a mistake. The people of the United States cordially approve the principle of arbitration for the settlement of international disputes. On every proper occasion thoughtful statesmen voice the wish and thought of the people on this subject in no uncertain way.

In the United States May 30th has become a national holiday, known as "Decoration Day," when the tombs of soldiers North and South are strewn with flowers, monuments are dedicated and memorial services held in which the duty and reward of patriotism are taught to uplift the ethics of political morality. On May, 31, 1897, at the unveiling of a soldier's monument at the National



Military Academy, West Point, General Russell A. Alger, Secretary of War, delivered an oration in the course of which he said:

"It is the fond hope of the best minds of every land that the time may come—and that in the near future—when armed forces in the field shall no longer be required, when all differences between nations shall be settled by the benign influences of man's best judgment, and that arbitration shall be substituted for artillery, musketry and the sabre."

As civilization progresses it must be increasingly true that the genius for organization, discipline, concentration and sustained effort required of successful military commanders will be attracted to the undertakings of industry and commerce. These qualities of character can win renown in the arts of peace as well as in the arts of war, and with greater individual and national benefit. Peace is demanded by all interests that are served by highly developed industrial, commercial and financial organizations. When the people are in agreement rulers cannot make war.

### THE COMMERCE OF THE AMERICAN HEMISPHERE.

FROM June 1 to 5, 1897, the most important commercial congress ever convened in the American hemisphere was held in the city of Philadelphia, U. S. A., under the auspices of the Commercial Museum and the Manufacturers' Club of that city. Delegates were present representing important trade organizations and the governments of all American republics. The occasion was the formal opening of the Commercial Museum as an international enterprise. The exercises were participated in by accredited delegates from all Central and South American countries. The opening address was made by Hon. William McKinley, President of the United States.

The purpose of this museum is to exhibit the raw products of every country, the kinds of manufactured commodities they import, and to give to the producers the kind of information they need to enable them to find buyers for their products in other countries, north or south.

The objective point of the discussions was to show in a practical way what things should be done, or should not be left undone, in order to stimulate to the fullest attainable degree inter-American commerce throughout the American hemisphere. The subjects treated pertained mostly to transportation and banking facilities, terms of credit, tariff schedules and methods of packing. The acquaintance, good will and general information resulting from the bringing together of such a body of practical and representative men is of high importance. Their approval of the plans, methods and exhibits of the Commercial Museum was cordial and unqualified. It was evident that every person saw in it a move in the right direction, and that its possibilities for doing good work in the cause of inter-American commerce so grew upon them as they studied its scope and meaning and compared views with each other from day to day, conservatism forsook them and they pledged their support to, and co-operation with, it in the fullest measure.

The foreign delegates are now making a tour of the important manufacturing and commercial centres of the United States, in each of which they will be the guests of the commercial bodies in the cities visited. They will be treated to a practical test of the unparalleled railroad transportation facilities of the United States by being carried throughout their entire travels in a train of parlor coaches devoted to their accommodation, which they will practically own from the beginning to the end of their journey.

Not so very far back in the history of mankind are found the periods when crusades for conquests, or for the propagation of a religion, were the only motives which impelled the people of one nation to visit those of other nations. In this industrial age trade is the moving force that causes most of the intermingling of the nationalities. In one direction or another commercial commissions from England, Germany and France are now exploring the countries to the south and east of them to discover the possibilities for trade, and on the American hemisphere similar movements, from

north to south and south to north, are in progress. The result of such pilgrimages must be to greatly stimulate commerce, promote international good will and broaden fields for enterprise.

### GREAT DESTRUCTION CAUSED BY INSECTS AND WEEDS.

A COUNTRY cannot be too painstaking in preventing the importation of insect pests and noxious weeds. In the case of epidemic disease alarm is soon given. Government and people co-operate promptly to prevent the ravages of the destroyer. In the case of insect pests and weeds, however, their first appearance generally attracts little or no attention. A place overrun with them is left to itself for a season or two, until the whole surrounding district is seen to be threatened with destruction. Extermination is then commenced in earnest. What might have been easily and inexpensively done at first is finally accomplished with great labor and expense, added to the direct damage done by the insect or weed.

American farmers in some sections of the country have had a costly experience with the potato bug, cut worm and Canadian thistle, so called. In recent years the State of Massachusetts has been dealing with the gypsy moth.

Almost thirty years ago Leopold Trouvelot, a French naturalist, brought this pest to the United States for the purpose of scientific experiment. Some of the moths escaped. Professor C. V. Riley, State Entomologist of Missouri, called attention to the rapid increase of the pests in New England and gave a warning of the harm they would do.

In 1889 hundreds of thousands appeared in localities where they had never been seen before, and destroyed every green thing they touched. Then the work of extermination began. In 1890 the Governor of Massachusetts appointed the first gypsy moth commission. It first estimated that a tract about a mile square was infected, and \$25,000 was appropriated for the work of extermination. In May following it was found that the infested tract was sixteen times as large as at first supposed, and the appropriation was doubled.

The State Board of Agriculture took charge of the work of extermination in 1891, and was given an appropriation of \$50,000 in that year and \$75,000 in 1892. In 1892 the spread of the pest appeared to be checked, but vigorous work had to be carried on to keep them under control. The State increased its appropriation to \$100,000 in 1893. Congress advanced \$100,000 in 1894 and \$150,000 in 1895. Up to the present time nearly \$700,000 have been used. This year for the first time there is a decrease in the amount of money required. Encouraging reports have reassured the many scientists who have seen in this little moth tremendous possibilities for damage to the whole United States.

Professor C. H. Fernald, of the State Board of Agriculture, says the territory covered by the gypsy moth was about 200 square miles. The work of extermination has cleared about half of this area. It is estimated that the cost of extermination will be about \$200,000 per year for the next five years, \$100,000 per year for another five years and about \$15,000 yearly for a third term of five years. This will make the entire cost of extermination exceed \$2,000,000.

The moth eats everything that grows except tobacco leaves. Professor Howard is to investigate the matter further this Summer for the National Secretary of Agriculture. If his report is satisfactory the burden of the work may be taken up by the National Government. If pursued carefully it is estimated the war against the moth may be completed within the first decade of the twentieth century, so that nothing but future importations need be feared.

The experience of the United States should serve as a warning to the people of other countries, teaching them the absolute necessity of making war upon these pests wherever they appear. The people must destroy the pests, or the pests will destroy the people.

At the present time it is reported that a whole business block in New York City is so overrun with "Bombay bugs" that tenants are on the point of cancelling their leases and moving to other



quarters. It is supposed these bugs are bred in coriander seed, a quantity of which has been stored in a building on the infested block.

The manner in which rabbits spread over Australia from a single shipment, until they became a pest in the land is well known.

The "water hyacinth," introduced as an ornament to a New Orleans gentleman's garden, spread until it has blocked navigation in parts of Louisiana rivers.

Transplanted water cress, it is said, has blocked some of New Zealand's streams.

These instances are sufficient to show the destruction or damage that may be caused from an apparently small or insignificant beginning.

### MOTOR CYCLES FOR ONE HUNDRED DOLLARS.

A MOTOR cycle for \$100, that will carry from two to four persons, is said to be among the possibilities. What a revolution in social and business life it will cause! Every one who can now have a \$100 bicycle could have a motor cycle and take a companion or two with him on his pleasure trips or to and from business. No stable, no hostler or footman, no hayrack or harness—merely a shed, back porch or cellar for shelter.

It is estimated that 2,000 men are at work in the United States trying to invent better motors for horseless vehicles, hundreds of others in Europe are engaged on the same task. It would seem that so much brain work if mingled with but little genius should accomplish desired results. Motors now cost \$250 to \$350. The effort is to reduce the price, make the motors lighter, smaller and more easily manipulated. Tricycles and light road vehicles are wanted to be put on the market at a cost of \$100 to \$125. Of course the cost of the superstructure could be made little or much—just as carriages cost more than buggies—but a serviceable light vehicle to carry two or even four people it is expected can be made, very much after the principle of the tricycle, at the price named.

In the construction of the motor three different kinds of power are being developed—gas, petroleum and electricity. Electricity should be the best and the cheapest, this is the opinion of Mr. Thomas A. Edison, the world-famous American electrical inventor. He claims that the most successful automobiles made thus far are those in which electric motors are used. They can go twenty-five miles or more without being recharged, at a rate of ten miles an hour. He expects the horse to disappear almost entirely so far as his use for street traction is concerned. Delivery wagons, busses, express wagons, broughams and all the heavier class of vehicles will some day be driven as easily by a storage battery as any other kind, if the battery is improved sufficiently, and that will unquestionably be done.

Motor cycles at such a low cost will permit the poor as well as the rich to crowd the parks and boulevards on every fine day. It is a revolution that is bound to come, and at a very early day. This is Mr. Edison's prediction which the world will be glad to see fulfilled.

### THE RAILROADS OF THE WORLD.

TRANSPORTATION facilities are important factors in the development of commerce. The cost of transportation frequently turns the scale in favor of or against localities and nations. In his recent address before the Iron and Steel Institute Mr. Edward P. Martin, its president, is reported in *The Mining Journal, Railway and Commercial Gazette* to have said:

"The cost of manufacture (in America) is being steadily reduced, great facilities to this end being afforded by the cheap rail and water transport. . . . The iron and steel manufacturers (of England) have done and are still doing all in their power to reduce the cost of manufacture, and it remains for the great railway companies in this country (England), who are obviously deeply interested in the maintenance and development of the chief sources of their traffic, to supplement these efforts by large reductions in

the cost of transport, and of dealing with the large and heavy masses of material that the altered condition of trade demands."

Recently published statistics place the railway mileage of the world at 444,860 miles. This mileage is divided as follows:

American Hemisphere.....	230,370
Europe.....	161,500
Asia.....	28,490
Africa.....	8,500
Australia.....	16,000
Total mileage.....	444,860

Of the mileage in the American Hemisphere 182,500 miles are credited to the United States. Of the mileage in Europe 21,174 miles are credited to Great Britain and Ireland.

There are ten countries in which the State does not own and operate the railroads, namely: Great Britain, Colombia, Mexico, Paraguay, Peru, Spain, Switzerland, Turkey, United States and Uruguay. Eighteen governments own and operate some of the railroads. These are Argentina, Australia, Austria-Hungary, Belgium, Brazil, Canada, South Africa, Chili, Denmark, France, Germany, Guatemala, India, Japan, Norway, Portugal, Russia and Sweden. Egypt and Nicaragua own and operate practically all their railroads, while Greece, Holland and Italy own part of their several systems but do not operate any, leasing all the present mileage to joint stock companies. In Canada about one-tenth of the total mileage is owned and operated by the government. On this one-tenth, as a result of government ownership and operation, the loss is something like \$500,000 per annum. The total mileage in Canada and Newfoundland is 16,230 miles. A loss of \$500,000 per year on one-tenth, 1,622 miles, is at the rate of \$308 per mile.

As competition for commercial supremacy becomes more clearly defined, and is adjusted by purely economic achievements rather than legislative dictation, the cost of transportation will be of increasing importance. As a final result every government owning and operating transportation facilities will be outdistanced.

### WHY AND WHERE AMERICAN FARM MACHINERY IS PREFERRED.

IN reporting an agricultural exhibition which was recently held in Johannesburg, South Africa, a Cape Colony journal stated that in the department of agricultural machinery almost all the honors fell to the American exhibits. Judging by the dispatches which reach us from time to time from different parts of Australia, the preferences of that country seem to lie in the same direction. Recently, too, we learn that large orders from Russian importers have been booked by American firms for farm machinery to be used chiefly in the newly opened up agricultural districts of Siberia, while in the Rio Platte countries of South America the demand is very great and constantly increasing. All these facts taken together point to one conclusion, namely, that for use in new and rapidly developing countries where land is plentiful and labor scarce, American agricultural machinery excels.

Nor should this be a matter of wonder. In the cultivation of the wilderness the United States was the pioneer. With the opening up of the West set in a new era in farming. Men were confronted with problems hitherto undreamed of. Instead of three acres and a cow, the farmer's estate came to consist of thirty miles of fertile cornland, for the harvesting of which, labor, the cheapest and most easily obtained of commodities in the agricultural districts of the old world, was practically unobtainable. The natural result of the new conditions was an imperative demand for labor-saving apparatus, the manufacture of which began to engross the brightest mechanical minds of the land. The demand then started has never since abated. In no other country in the world is agriculture of such paramount importance. Not only have we to supply food for our own seventy million people, but the drain on our produce to supply the densely populated sections of the old world is constantly increasing. It is estimated that 60,000,000 acres of grain and 50,000,000 acres of grass are annually harvested in the United States, and each year sees hundreds of miles of virgin soil added to our cereal-producing territory; but farm labor still remains scarce;



its place must be supplied by machinery, and, as in all operations on a large scale, the saving of time is a most important question, the demand for improved time-saving machinery is increasing. Hence it comes that in the manufacture of reapers, binders, mowers, harvesters and the like, America now leads the world.

Now seeing that the conditions that prevail in South Africa, Australia and Siberia are similar to those of our own country, viz., abundance of land and scarcity of labor, it is only to be expected that contrivances evolved by the needs of the latter should be peculiarly suited to meet the requirements of the former.

### A NEW MARINE MOTOR.

THE frequent announcements of new methods of developing motive power show such marked progress in so many directions that it is only natural that we should ask how long it will be before the steam locomotive and the steamship, as they have been known for the past fifty years, will pass away as the stage coach and clipper sailing ship have done before them.

The steam turbine, which only a few years ago was received with much applause and at that time gave rise to some extravagant prophecies on the part of the engineering fraternity, has not ceased to astonish people by its performances. Its latest feat is in connection with navigation. An inventor named Parsons has fitted an English boat, the Turbinia, with three steam-turbine motors of the three stage compound order, each turbine of the series being a separate motor, although the three work in series. The boat is 100 feet in length, 9 feet beam, 44 1-2 tons displacement. Each motor works its own propeller shaft. The steam is expanded a hundred-fold. The screws are 18 inches in diameter. The steam pressure in the boiler is 200 pounds, and at the engines 150 pounds. The speed attained at the test was 32.61 knots an hour, said to be far beyond that made by the fastest torpedo boats heretofore.

### THE JUBILEE OF THE HAMBURG-AMERICAN LINE.

ANOTHER jubilee was celebrated recently, which, though overshadowed by England's royal festival, is yet full of significance and interest to those who follow the trend of international commerce. This comparatively obscure ceremony was held concurrently in Hoboken, N. J., and in Hamburg, Germany, and the occasion was the fiftieth anniversary of the establishment of the Hamburg-American Steamship Company.

Even to those not directly interested the event is noteworthy, inasmuch as the progress of the Hamburg-American Line since its birth, fifty years ago, is intimately associated with two of the most important phenomena of the century, the development of the transatlantic traffic and the rise of commercial Germany.

The Hamburg-American Line was established in 1847 and, with the exception of the Cunard, is the oldest of the transatlantic lines. The first of its vessels that crossed the Atlantic was the Deutschland, a square-rigged, three-masted sailing ship of about 200 tons burden, which made the voyage in forty days. The Deutschland was followed by others of the same type, one of which by traversing the distance from Southampton to New York in nineteen days achieved what was considered a remarkable feat. The first steamships belonging to the line were the Borussia and the Hammonia I., each of about 2,000 tons register. They were launched in 1856, when a regular monthly service between Hamburg and New York was inaugurated. Henceforth the company grew and prospered. Its capital was augmented, new ships were added and its operations were extended to other ports, until at the present day it has a service that spans the world, a score of liners, a tonnage that exceeds that of any other line and the largest and finest freight vessel in existence. As for the general progress of steam navigation, since the birth of this line, it is sufficient to note that the record of Hammonia I. from Southampton to New York was 12 days and 6 hours, which at the time was considered marvellous, and that the

Fürst Bismarck, the company's present crack liner, has accomplished the distance in 6 days 9 hours and 43 minutes.

The success of this great line is due to enterprise. It was enterprise, almost amounting to temerity, which induced its promoters to challenge the supremacy of the English mercantile marine, and throughout its progress it has always manifested that same spirit of enterprise in seizing on all the latest improvements and insisting, regardless of cost, that its vessels shall always be the most perfect that the best builders can turn out.

That so vigorous a mode of procedure must have had a large effect on shipping is easily imagined. It is the keen competition due to the existence of such lines as this that has evolved marine wonders like the Lucania, the St. Louis and the Majestic. To the Hamburg-American Line more than any other, except perhaps the Cunard, are due our thanks for the promotion of trade between Europe and America.

And the successful progress of this company epitomizes the progress of Germany. It is by just such enterprise, just such persistence, just such thoroughness and care for detail that the German Empire has come to be a first-class commercial power. Fifty years ago Germany had no commerce; to-day it is a member of the great commercial triad, with Great Britain and the United States as its rivals.

### A WASTE OF ENERGY IS A WASTE OF MONEY.

OFTEN as good a profit is made by preventing waste as by increasing production. When so many opportunities for waste occur, as in the operation of electric roads, the science of preventing waste is now becoming of as much importance as that of construction and equipment. It has been estimated that motormen waste power, by the careless handling of their controllers, to the amount of twenty per cent. This being true, it will be recognized at once that such a check on the motorman is as essential as is a check on the conductor. To meet such a want Mr. L. R. Cravath has invented an indicator which is placed in circuit with the controller in such a way that the car cannot be operated without it.

The greatest waste of current occurs in starting and stopping. The Current-Recorder, as the indicator is called, is locked and given at the beginning of each run to the motorman, who at its end returns it to the office. The record kept in the office for each man shows the number of miles run and the amount of electrical energy consumed.

As the indicator does not record except when an excess of current is used, the record gives merely a comparative account of the performance of each motorman. At the end of the month a bulletin is posted showing the performance of each man, and it is expected that this will have some effect in reducing the amount of power wasted. Careful tests have shown a saving in power of nine per cent. after the indicators had been in active service about two months. This is equivalent to nine per cent. efficiency added to the operation of the plant, an exceedingly desirable gain.

### THE OLD REPEATING ITSELF IN THE NEW.

THE enthusiasm which greeted the appearance of the submarine torpedo boat Holland, whose launching was described in our last issue, goes to prove that the success of many of our recent inventions is not so much a mark of the peculiar genius of the inventor as of his good fortune in obtaining the requisite co-operation of business management and capital. For submarine navigation is not new. Nearly one hundred years ago the Holland was anticipated by Robert Fulton's Nautilus, which, though she proved a success on trial, has been practically forgotten.

According to the account given by M. Eugene Debose, of the French Navy, in a recently published paper, the Nautilus was launched near Rouen, France, on July 20th, 1800, and tested the same day in a stretch of water twenty-five feet deep. The experiments were successful, and the next day the inventor went down the Seine to Havre, where the harbor was placed at his disposal.



The boat sank and rose at will, and moved beneath the water impelled by a screw worked by hand, also an invention of Fulton, who thus anticipated the later application of the principle by Ericsson. The invention being proved practicable, Fulton sought aid from the French Government, and not obtaining it, went to England where a similar fate awaited him. These facts appear to have been generally forgotten till again brought to view in the memoir of Mr. Debose.

One reason for Fulton's want of success in obtaining material aid may be easily found in the fact that he was ahead of the demand. Now, when heavily armored battle ships have made submarine torpedo boats a necessity, a demand has been created for submarine navigation. This demand will doubtless bring to Mr. Holland and his contemporaries the material aid that Fulton could not obtain and thus enable them to achieve a practical success.

### MANJAK: A NEW MINERAL.

SOME months ago large quantities of a new mineral, locally called "Manjak," were discovered in the island of Barbados, West Indies. In point of utility Manjak bids fair to out-rival all the similar substances that occur in various parts of the world. It is of a black color, possessing high lustre and having a bright conchoidal fracture closely resembling that of newly broken pitch. It is found very near and sometimes upon the surface of the ground in seams varying from 1 to 2 feet in thickness, running usually at an angle of about 40 degrees and in close proximity to rocks. It is supposed to have been formed by the drying up and consolidation of petroleum, which occurs in abundance in the same localities, and is often seen oozing out of the ground or floating down the streams. In composition it is not unlike Trinidad pitch, the Utah gilsonite and the Canadian albertite, but is of superior quality to any of these.

Among the various uses to which Manjak has been successfully applied are the following:

1. As insulation for electric wires such satisfactory results have been obtained from it that it is expected by some experts that it will soon supplant rubber in all waterproof works.

2. As varnishes of the best quality.

3. As bituminous concrete in asphalt roads and pavements.

4. As patent fuel mixed with peats or other organic matter.

5. In small percentages as an intensifier for the illuminating power of coal gas.

This list is sufficient to show that it will find a market in all manufacturing countries.

SPEAKING of the export trade in boots and shoes, a Boston manufacturer said recently: "We are doing in addition to our home business, a considerable foreign trade. This feature of our business is one of many years standing, but during the past few years it has assumed large proportions. The shoe manufacturers in foreign countries are rapidly taking up American ideas in connection with this industry, and are now calling for the new dressings, waxes and other materials which are being used here at home. Especially is this the case in Germany. They are bright men, the German manufacturers, and take up new things as soon as they are convinced that there is merit in them. A good many shoes are also being made in Switzerland at the present time, and we are shipping a considerable amount of shoe-dressing to that country. Australia is taking many of our goods. We are making this week a large shipment of the old North Bridgewater dressing to Melbourne, in that country." The manufacturer further stated that his firm is doing a good deal of business both in this country and abroad, on lines of cements, of which we make a great variety, and which are used by leading shoe manufacturers all over the world. It has many testimonials from large concerns as to the reliability and effectiveness of the cements which it produces.

TWO of the most interesting automata now working within the limits of the United States are those used by the Government for counting and tying postal cards into small bundles. These machines were made in Connecticut, and the two are capable of counting 500,000 cards in ten hours, and wrapping and tying the same in packages of twenty-five each. In this operation the paper is pulled off a drum by two long "fingers" which come up from below, and another finger dips in the vat of mucilage and applies itself to the wrapping paper in exactly the right spot. Other parts of the machine twine the paper around the pack of cards, and then a "thumb" presses over the spot where the mucilage is, and the package is thrown upon a carry belt ready for delivery.

### Marine Searchlight Apparatus.

THE use of electric searchlights on board vessels, not only of the Navy, but also those of the merchant marine as well as on yachts, has within recent years been steadily growing, as improvements in the mirrors and the operating and controlling mechanism have given to the owners and the Government reliable projectors.

In the manufacture of a perfect searchlight are two main parts, each of which must of itself be perfect—the lamp and the reflecting surface—and unless the greatest of care is given to the design and workmanship of the first, and the grinding and polishing of the mirror, the result must be failure or only semi-success. The former requires electrical and mechanical knowledge of the highest grade, the latter grinding and polishing machinery operating with mathematical accuracy.

In the apparatus made and used in this country the light-reflecting surface is a silvered glass concave lens, so ground that when the arc of the lamp is in its focus the reflector beams which proceed from the mirror are parallel. Two types are used, the Mangin and the parabolic, the former having two spherical surfaces of different radii, the reflection and refraction causing the rays to be projected in straight lines, the latter having true parabolic surfaces. Still a third type is used where the illumination of a large area at short range is desired—the hyperbolic—but in this case the mirrors are of metal silvered.

The lamps are of two types, the inclined and the horizontal, according to the position occupied by the carbons. Both lamps are automatic and focus in feeding. The first type is used in the 12-inch projector, either type in the 18-inch, while for larger sizes the horizontal type has been found the most suitable. All the lamps are designed to operate on direct current incandescent circuits, a regulating rheostat being connected in series with the lamp to bring the voltage to that point at which the best results can be obtained, which is from forty to fifty volts, according to the current taken.

In order that the person controlling the direction of the beam may most satisfactorily direct it, three systems of control have been devised—pilot house, rope and electrical—depending upon the location of the projector.

The electrical control can be applied to any size, but is more suitable to the 24-inch and larger sizes. Horizontal and vertical movement of the drum containing both lamp and mirrors is given by two small motors concealed in the pedestal at base and controlled by a single lever set on a small pedestal containing the resistances and switches. By throwing certain disengaging clutches the electrical control may be cut off and the projector be controlled by hand. Electrical control allows the projector to be operated from a point almost any distance from it. The same result may almost be attained at less cost by means of the rope control, horizontal and vertical movement also being attained by the movement of a single lever. In this case, however, the distance between operator and lamp must necessarily be limited.

When the projector is set on the pilot house of a steamer, pilot-house control is usually employed, the actuating rod passing down through the roof of the pilot house and terminating in a lever movement which gives the necessary horizontal and vertical deflection to the beam.

The solid beam of parallel rays has its own special use in throwing an intense light upon a restricted space. It is, however, sometimes necessary to illuminate a very much larger space, and instead of a beam to project upon it a horizontal band of light. This is effected by diverging lenses set in a frame similar to that of the plain glass door, which it replaces when occasion arises for its use.

To allow of observation of the arc from outside without exposing the eye to the blinding glare from the mirror, each projector has a prism let into the side of the drum carrying both lamp and mirror. Through this prism the arc may be observed and regulated. The heat generated by the burning carbons is carried off through ventilators let into the drum at the top and bottom.

The standard sizes of these searchlights are based on the diameter of the reflecting lenses—12, 18, 24, 30 36, and 60 inches. The greatest searchlight in the world is of the latter size. This light is now placed on the top of Mount Lowe, in California, whence its beams are visible many miles over the waters of the Pacific.

AN improved kind of steam engine, in which two cylinders are arranged side by side and have their piston rods connected to a common crank shaft, is credited to the inventive genius of H. S. Blanchard, of Helena, Mont. The engine has no dead centre, and its rotary valves are arranged to so cut off and out in the stream that a volume of one full port will always be exerted on a piston, when the crank is on the quarter, giving the greatest leverage, there being no pressure exerted and energy lost when a crank is on the centre. The cranks are placed at an angle of ninety degrees to each other, one being arranged directly on the shaft and the other on the fly wheel, the steam chest being midway of cylinders. In the bottom of the steam chest is a base plate serving as a seat for the rotary valves, which revolve above groups of ports in each end of the steam chest, the ports being in pairs and connected with channels or leads which deliver into the end portions of the cylinders, there being also ports connected with channels that lead to the exhaust pipe. The valves have each a steady and constant motion in one direction, although moving opposite to each other, but by means of a forked lever the engine may be easily and instantly reversed. Each cylinder begins to take steam when the crank arm is at an angle of about 45 degrees of dead centre, but one cylinder being in power at a time, and remaining in power while the crank arm is pressing through an arc of about ninety degrees, when steam is shut off from the first to the other cylinder.



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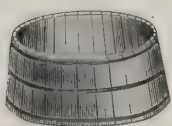
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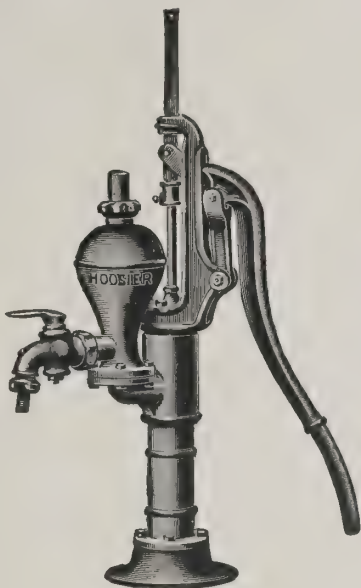
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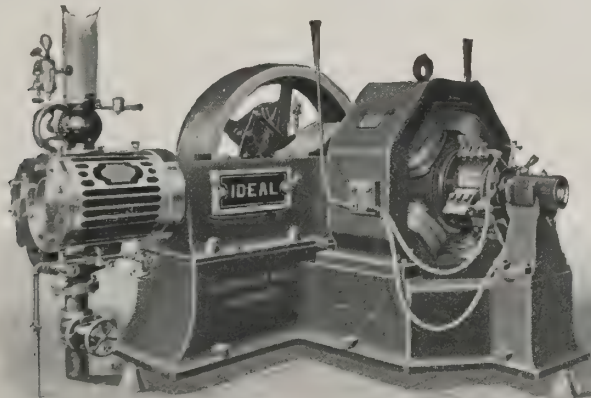
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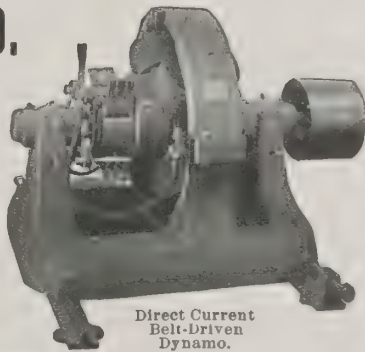
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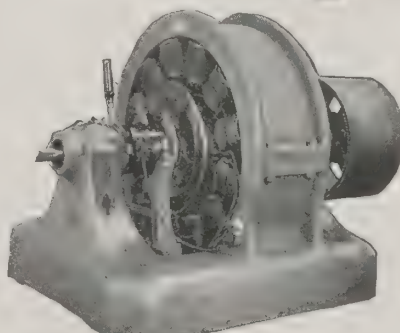
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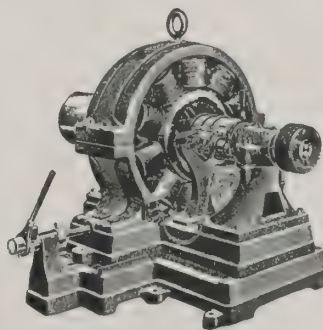
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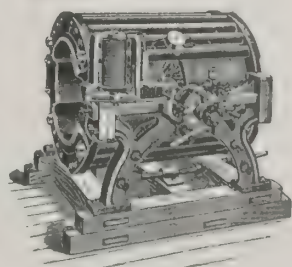
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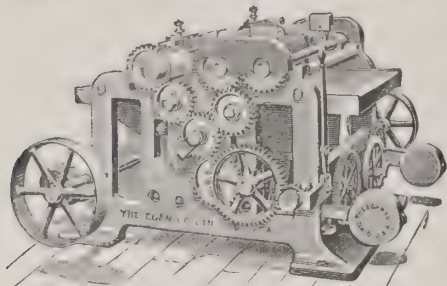
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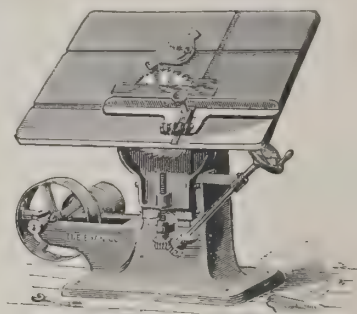
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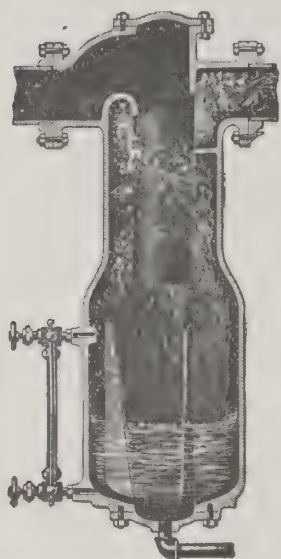
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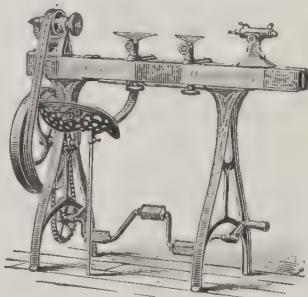
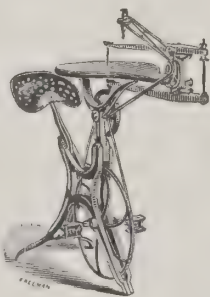
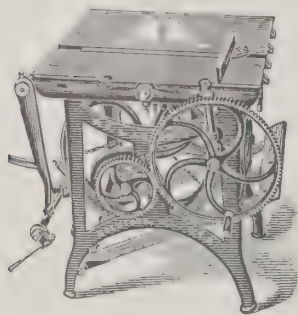
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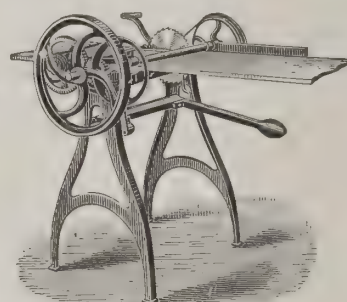
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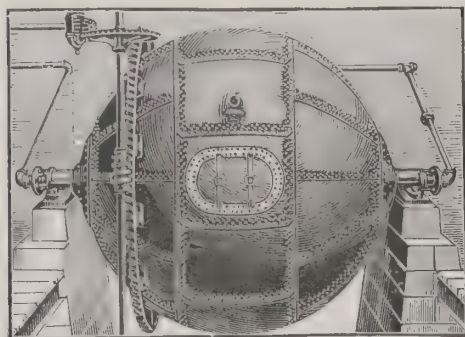
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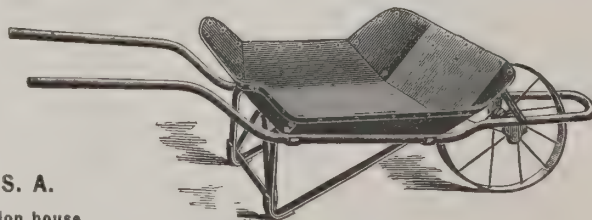


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### Coal-Handling Machinery.

IN one single respect this city is woefully lacking, despite its advancement along particular lines of progress. That is in the matter of handling coal, whether for use on shore or in the numberless vessels that hourly tie up at the various piers. The old system is still in vogue, and the great ocean greyhounds while in port are constantly loading in their cargoes of coal for their outward voyages. The process is slow and costly; but, for some reason or other, it has never been abandoned. Why it is difficult to say, when this city is the headquarters of the heaviest coal-handling machinery plant in the country, and when its machines are scattered all over the face of the globe. Numbers of the elevators in the Harlem and East rivers utilize improved machinery and hoist in coal from barges at the rate of 2 tons about every 3 minutes, at a cost of about  $1\frac{1}{2}$  cents per ton. The stevedore charges are 15 cents for shovelling and hoisting 1 ton of coal from a barge. In Boston the cost is 25 cents per ton, and in Milwaukee and the Lake ports 35 cents per ton. For wheeling to the bin, an average distance, the cost is 2 cents per ton in New York and Boston and 4 cents in Milwaukee. Screening from the stock pile and loading into carts or wagons is 6 cents more. The total cost of handling coal from the hold of the vessel until it reaches the delivery wagon is about 35 cents per ton in New York, 46 cents in Boston and 55 cents in any city on the Great Lakes. The cost of doing the same work with improved machinery is 2 cents in New York, 3 cents in Boston and Milwaukee. Thus, we see, a dealer handling 40,000 tons in New York would save in a year \$12,000, in Boston \$17,000 and at the Lake ports \$20,000.

This should be all the argument that is needed to convince any sane business man that coal-handling machinery is a good thing to have about him. Yet New York sticks to the old way, and people who buy the coal pay the difference in cost and seem to keep in a tolerably cheerful frame of mind about it. Passengers on the East Side elevated road have certainly seen that great open bucket at 129th street and Third avenue going up and down, and have wondered how it worked. It acts with almost human intelligence, fills itself, is hoisted high in the air and automatically dumps itself at the top of the incline, and every time it reaches the top 2 tons of coal are thrown into the hopper. All that it requires is for a man in the barge bottom or boat hold to scrape the coal out of the corners when the work is nearly done. The bucket will do the rest. In fact if it gets hold it will nearly lift the boat. On one occasion a skipper was told that he had better protect his keelson, but he said: "Let'er go!" And when the bucket went it took a very large section of the keelson with it, like a bite out of an apple. Automatic machinery could be arranged that would throw 7,000 tons of coal into the bunkers of the St. Louis or the St. Paul in about 3 hours, perhaps less. Under the present system they are coaling all the time they are in port. Variants of the business are automatic railways, steam shovels, cable railways and hoisting engines.—*N. Y. Tribune.*

### Portable Gas Plant.

L. T. BULLEY, of New Haven, Conn., has obtained a patent for a portable gas plant. This machine will allow each householder to manufacture all the gas needed for illuminating and heating purposes at a cost of nearly 50 per cent. lower than the present charge.

Perhaps the most important feature of Mr. Bulley's gas is that it will not asphyxiate a person like ordinary coal gas. This is due to the materials used in the gas, which is simply a mixture of gasoline vapor and pure air. Remove the air, says Mr. Bulley, and simply the hydrocarbon remains. A person could sleep in a room with an ordinary gas jet turned on full force 100 hours before feeling any effect of this hydrocarbon. In other words, a man could retire at night, blow out the gas and rise the next day without feeling any effect whatever from the escaping gas.

Mr. Bulley has constructed a model plant in his rooms. The gasoline for the gas is stored in the back yard, out of danger in time of a possible explosion. To prevent any explosion it is buried several feet in the ground. A system of pipes carries compressed air to the gasoline tank, where the gasoline vapor and air are mixed in right proportions. Then the gas is simply sent through an ordinary set of pipes for use.

The gas manufactured by Mr. Bulley is white, clear and steady. It gives a remarkably strong light and not too bright. Mr. Bulley intends to make small plants so that any person can manufacture his own gas, which means, in many instances, that the death knell of the cheating gas meter is sounded.

### New American Turbines at Great Falls, Montana.

THERE has recently been installed in the plant of the Boston and Montana Consolidated Copper and Silver Mining Company, of Great Falls, Mont., what is probably the largest and most powerful pair of horizontal turbines for the head of water under which they will operate that have ever been built.

These turbines are of the new American pattern of the latest design, 57 inches in diameter, and under the head of 50 feet will develop 3,945 horse power. The turbines are placed on a cast-iron draught chest and discharge centrally through a draft tube 10 feet in diameter, and are incased in an iron flume 14 feet 4 inches in diameter, 32 feet 6 inches long, made of  $\frac{1}{2}$ -inch tank steel, with cast-iron heads, and the flume is mounted on two pairs of double I beams, 20 inches deep, 38 feet long.

The shaft in the wheels is 10 inches in diameter, 42 feet 2 inches long, made in two sections, and its weight is over 5 tons. The clamp coupling which connects these two sections of shafting in the centre of the draught chest weighs considerably more than 1 ton. There are stands, weighing 8,000 pounds each, outside of flume at each end, which carry the journal boxes for this shaft. The two turbines, with their complete outfits, weigh approximately 250,000 pounds.

These turbines operate two Westinghouse electric generators, one coupled directly to each end of the shaft, which runs from 144 to 160 revolutions per minute, and are used for electrolytic refining. The varying revolutions are required in order to increase or diminish the current as conditions may require.

The power of these wheels is also utilized for driving an arc-light dynamo and the two 50 horse-power exciters for the large generators, the power being transmitted from wheel shaft to dynamo by means of a 20 inch double leather belt, and there still remains a surplus power in the wheels, which is not being utilized at present.

It is further estimated that if a pair of these 57-inch new American turbines of this design and capacity were placed in operation on the new water power at Niagara Falls under 140 feet head they would develop 18,494 horse power, and would require a shaft 15 inches in diameter to safely transmit the power, estimating the power to be taken off at each end of the shaft, as is the case at Great Falls, Mont.

Before shipping these wheels to Great Falls, the builders had them tested, and both the right-hand and left-hand turbine showed an average efficiency from three-quarters to whole gate, inclusive of  $81\frac{1}{4}$  per cent. These wheels were sold on a guarantee that they would show an average efficiency of 80 per cent. from three quarters to whole gate, and would develop 2,800 horse power under 40 feet head, and they exceeded the guarantee both in horse power and efficiency.

### Protection Against Rust.

THE protection against rust of bright parts of machinery, when put out of service for any appreciable length of time, becomes an important matter indeed in those countries of the South where there is a "rainy season." In the sugar factories of Cuba, for example, it became a practice long ago to bury the parts to be protected in air slaked lime, and long lime troughs are, therefore, characteristic adjuncts to the equipment of every one of these establishments. At the end of the cane-grinding season the machinery is dismantled, and everything about it that would become ready prey to the all-prevailing atmospheric moisture is stripped off, packed away in the lime box, and left there in all security until again needed. The conventional coating of white lead and tallow would accomplish the desired protection nearly as well, perhaps, but putting it on and afterward again taking it off are quite as troublesome, if not more so, than the disconnection of the machinery and its partial burial. The lime box has for many years demonstrated its efficiency and will for many more, no doubt, continue in service.—*From Cassier's Magazine.*

A RAILWAY car fitted up as hotel and storeroom for commercial travellers has recently left St. Louis on a trial trip of seventy days. The party consisted of four salesmen and four advertising men, for whom comfortable sleeping quarters and an excellent cuisine are provided. It is believed that by this method both time and expense can be saved, and the discomforts and inconveniences incident to a travelling salesman's life will be avoided. In hotel and transportation bills the difference will be in favor of the hotel on wheels. Forty stops are to be allowed on this experimental trip, the average being two days at each town, unless longer stays are justified by local conditions.



### Trains by a Third Rail.

THE new electric railway over the line of the New England Railroad between Hartford and New Britain was opened for public traffic recently and it was operated with success all day. There were no ceremonies attending the opening of the road for public use, but promptly at 6:30 in the morning two trains began the work. One train left Hartford at that hour and another left New Britain. There were many persons about either to see the trains start or to take passage in them, and as the day advanced and the weather cleared the number of both sightseers and passengers increased until during the afternoon every train went out fully loaded.

There was no end of complimentary things said about the new service by these passengers, and not a few of the observant men aboard said that the successful operation of this road marked the beginning of a new era in rail-roading which was bound to end in sending steam locomotives to the scrap heap and the substitution of electricity for the propelling power of trains.

When this comes about the man who will have earned a high place for foresight and enterprise will undoubtedly be President Charles P. Clark of the New York, New Haven and Hartford Railroad. He began long ago watching the application of electricity for traction purposes and to study the methods of its use. That it could be used with success on elevated roads was proved in Chicago on the Intramural road during the World's Fair, and later, on the Metropolitan West Side road and in Liverpool, England. In the latter part of 1894 Mr. Clark determined to begin practical experiments with it as a substitute for steam and surface roads. It was a radical movement, but only what might well have been expected of one whose work during the ten years of his presidency of the New York, New Haven and Hartford road has been one of constant improvements. The four-tracking of that road, the abolition of grade crossings, building new and improved stations, the laying down of heavier rails, and the introduction of the latest and best improvements in rolling stock are part of the evidences of a policy which Mr. Clark introduced and is carrying forward.

In beginning the work of applying electricity to surface work on steam roads Mr. Clark sought a practical engineer, Col. N. H. Heft, of Bridgeport, who had organized the Bridgeport Traction Company and other trolley companies, and knew all that was to be known then about the actual difficulties to be met with in electric traction. They began their work on a peculiar piece of railroad at Nantasket Beach, Mass., the Coney Island of Boston.

There was a railroad there about seven miles long, snakelike in its crookedness, and with stations about every 1,000 feet. This road was equipped with overhead trolley wires of a peculiarly heavy construction and double tracked, and it was opened for business in June, 1895. Of this experiment and those which have followed it, leading up to the opening of the New Britain and Hartford road to-day, President Clark says:

"The facts about the use of the electrical current by the New Haven road as a means of transmitting power for use upon trains running upon standard roads are these: It has long been known that much more energy can be developed in a stationary engine from a given quantity of coal than it is possible under the conditions prevailing in a locomotive. Consequently if this energy can be transmitted without serious loss and made to do its work economically at the end of the transmission, great benefit would result. But whether it would be commercially practicable to effect this required the solution of a number of questions.

"The first one was whether any known appliances possessed sufficient power to answer the requirements of standard service. Mainly to determine this point a very substantial trolley construction was made upon the Nantasket Beach branch and put in use in the summer of 1895.

"The experiences of that summer made it certain that sufficient power could be generated, conducted and applied.

"The operation of the road by trolley for the seven miles gave great satisfaction to the public, especially because the power being devisable, trains were run as frequently as the necessities of the business warranted.

"We were so well pleased with the results of the summer's business that estimates were made for extending the trolley from Nantucket Junction toward Braintree on its way to Boston over a double track road already constructed. The Nantasket Beach branch had been double tracked with the trolley experiment in view, and the distance between the tracks was made greater than usual to allow the suspension of the trolley wires from a single line of posts located between the tracks, thus cheapening the cost of construction while lessening the liability of accident to passengers by contact with the posts.

"But when we came to take up the question upon a road already constructed and double-tracked, the distance between the tracks not being sufficient for a centre line of posts, the alternative was presented of spreading the double tracks to give opportunity for the same kind of support (which we found would involve enormous expense in the matter of bridges, whether over head or under foot), or of supporting the trolley wires by yokes held in place by posts outside of both tracks. Either course added enormously to the expense, and we turned our attention to the use of a third rail, located between the running rails, which would involve no changes in the roadbed, and, indeed, save the cost of any overhead work. After various conferences it was determined to try a third rail with the simplest form of insulation, namely, wooden blocks resting upon the ties.

"To prevent the destruction of this insulation the rail was made in the shape of a flattened 'A,' the blocks being narrower than the rail, which formed a watershed keeping the blocks dry. Between three and four miles of this rail made heavy in order that it might conduct a large current, were laid in the

Spring of 1896, and it worked through the whole Summer with satisfactory results. Indeed, we were able to supply the current from the end of this third rail to one of our connecting street railways during repairs to its power house with entire satisfaction to them and an absolutely better result in our own power house than when we were running only our own three miles and a half.

"That brings us up to the close of 1896, and it was demonstrated that with a sufficient volume of traffic and consequent desirability of affording a frequent service without great expense it was practicable and economical to use the third rail under such conditions. These experiments, however, did not determine the question of whether the apparatus would work satisfactorily all the year round, and especially whether the public would prefer the advantages of frequent trains and lighter grades upon well constructed roadbeds in competition with parallel street railways, a very important question for steam roads to consider before deciding upon a change. These questions would be measurably decided by its use between two cities like New Britain and Hartford, about nine miles apart, both terminal stations being conveniently located in the centre of the cities. Largely to determine the question the directors of the New England road decided to apply the third rail upon one of their tracks.

"The travel between these cities not being of sufficient volume to justify the expenditure for a power house for this sole purpose, the New Haven company determined to construct a power house at Berlin, from which point its use might ultimately be extended in four different directions if no practical difficulty should present itself, and it has been so located. The third rail is laid to New Britain, and thence to Hartford, a total distance of about thirteen miles. I do not consider that the practical use of electricity for transmitting power for standard roads is in all respects beyond the experimental stage, judged from a commercial standpoint. There can be no question about the cheapness of generating the power, or about the transmission of it economically, but further experience is necessary before it can be said certainly that the motors can be used economically for the varying conditions of load, physical and electric. Until they are proved to be so and sufficient time has been given to ascertain definitely the cost of repairs, the final balance cannot be obtained. That the locomotive will follow the old stage coach and be relegated to the scrap heap is by no means determined, but that the motor car will soon supersede the locomotive on suburban commutation routes seems probable."

The power house at Berlin station is almost in the centre of a district which contains four cities with an aggregate population of about 125,000 persons, besides a number of smaller places, and none of these cities is more than thirteen miles away. Hartford claims a population of nearly 70,000 and New Britain of more than 20,000. Heretofore the schedule of steam trains gave a service of eight trains each way a day.

The western track is still devoted to steam trains, while the eastern track carries the electric trains. Each is operated in a single-track separate road. The electric trains begin running at 6:30 A. M. and continue at half-hour intervals until 11:30 P. M., one train leaving each terminal at the same time. Mid-way of the line is a turnout where the north-bound train waits for the other to pass it.

The A-shaped rail which carries the electric current lies in the centre of the track, raised free of the ties by blocks of wood. Through this passes the whole of the 500-volt current which propels the cars.

At the stations the electric line is fenced in, and everywhere, if one is seen approaching the track, a warning cry is shouted of "Do not touch the rails!" Where the tracks cross roadways at grade, as they do at four places between Berlin and New Britain and at eighteen places between New Britain and Hartford, the third track is omitted, the current being carried across the breaks underground. At these crossings cattle guards are put into the tracks to keep men and animals off the live rail, and fences extend back for some distance on each side. A person might get a serious shock if he got into contact with the centre rail and one of the outer ones at the same time, but it seems doubtful whether it would be fatal. Careless workmen have repeatedly stepped from rail to rail without serious results, and recently a boy climbed over the fence at Hartford and walked over the track with wet shoes. He said the shock made his shoulders twitch, but that was all.

The Berlin power house is equipped with the newest devices in boilers, engines and dynamos, and it is built so that it can be extended indefinitely in size.

If the electric lines already equipped prove satisfactory, their natural extensions would be to Middletown and Meriden. At Meriden the railroad company owns the street trolley system, and the current for this eventually will be generated at Berlin.—*New York Sun*.

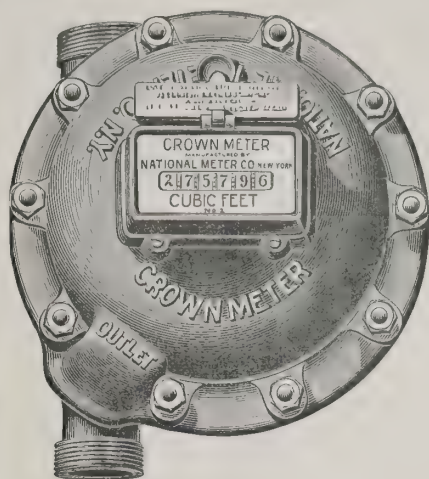
REPORTS of railroad improvements come from many points. One of the leading Eastern locomotive works is finishing twelve high-grade engines for China, having received the contract after close competition with foreign manufacturers. This line of export business is proving an important adjunct to trade. The record of locomotive building in this country up to date for four years aggregates 850 locomotives, of which 225 have been sent to Brazil, 74 to Russia and 67 to Japan. Some 829,355 tons of rails have been ordered by various railroad companies since the pool dissolved. The current requirements for light sections from the lumber and mining districts, and other sections where development is going on, involve a tonnage that will bring the year's report up to a very creditable record.

—A very large engine has lately been built for a plant at Sharon, Pa. With hub and shaft, the fly-wheel of this big machine weighs ninety-nine tons. The wheel has seven spokes, with the rim, and each weighs ten tons.



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Yours very truly,

J. C. CUSHMAN,  
Chairman of Water Committee.

They increase the revenue,  
Restrict the waste,

and assist in maintaining a uniform pressure in the water main.



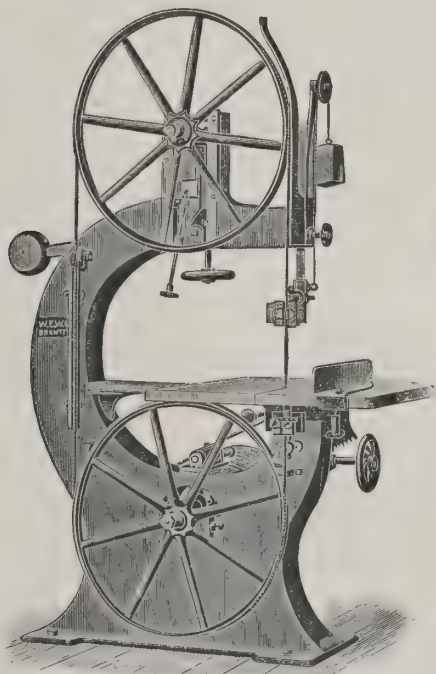
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[JUNE, 1897]



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## BAND RE-SAWS.

No. 5 Band Resaw.—48-inch wheels; saws 24 inches wide, 5 to 40 feet per minute. Resaw swings clear of machine when required. Weight, 4,500 lbs.

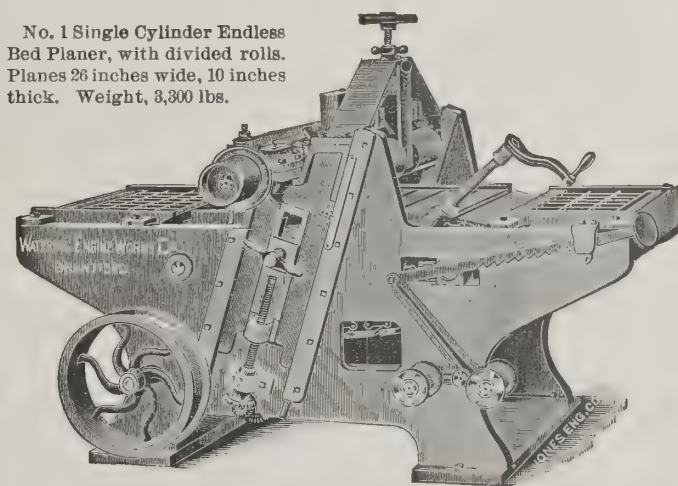
No. 6 Band Resaw.—48-inch wheels; takes saws to 3 inches; cuts 30 inches deep. Weight, 4,300 lbs.

No. 7 Band Resaw.—54-inch wheels; 4-inch saws; cuts 30 inches deep and to center of 10 inches. Weight, 5,300 lbs.

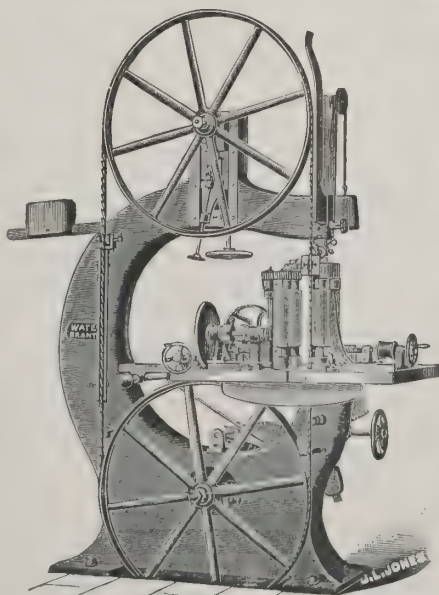
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CANADA.



### New, Quick Typewriting.

SINCE the typewriter has made for itself as firm a place in modern life as the cook stove, the sewing machine, or the bicycle, numerous attempts have been made by inventors to devise a practicable machine which would write words at one stroke instead of single letters. Much clever work has been done in this direction, but as yet there is no machine in the market which will accomplish the work.

Early in the history of the typewriter there were also many schemes for making machines which would do stenographic work. Some of these were embodied in metal, and others got only as far as drawings, which may or may not have reached the Patent Office. Others still never got outside of the heads of the inventors. That there is a field open for each of these classes of machines there can be no doubt. The latest aspirant for honors in this direction is George K. Anderson of Brooklyn, who took out letters patent for a word-writing typewriter, which is meant to take the place of ordinary shorthand writing, at the same time making a record which can be read by any one.

The results which Mr. Anderson's machine is capable of, and the mechanical cleverness and simplicity with which these are accomplished, make the machine worthy of notice. Mr. Anderson says that in his studies, made in preparation for devising this machine, he found the speed of operating the ordinary typewriter was clearly limited by the fact that but one key could be touched at a time, and but one character printed at a time, while with each of these operations the feeding and shifting mechanism had to be moved. By a fingering system which would bring all the fingers into play these operations might be hastened, but not enough. On the other hand, if all the fingers could be made available at once to select the letters for a word and then the word be printed with a single stroke of the hand, he believed that the necessary speed would be obtained to take speeches, testimony, or correspondence from dictation instead of having to use pen or pencil and shorthand characters. This is the kind of machine he has made. The whole affair occupies a space only 6 inches square and goes into a case which is only 2 inches deep after the roll of paper is removed and its holder folded down. The machine and its case weigh only about 2½ pounds. An illustration would be necessary to show the clever way in which Mr. Anderson has made a large combination of characters available for the operator's use, the ingenuity of the arrangements of these characters, and also how one person can operate any or all of twenty keys without changing the positions of his hands for any possible combination. All the letters and characters that are to be printed are to be found marked upon sixteen keys, which lie next to one another within four outer keys. If you press upon any of these keys without touching either of the outer keys you will find that you have printed the letter or character which is marked on the end nearest the operator. Now, if you want to print any of the letters in the second line, you can do it by pressing at the same time upon one of the outer keys, which are marked "con's line 2" or "vow's line 2," which bring forward either the consonants or vowels as they may be wanted. So, also, with line 3. Figures are printed by using the fingers of the right hand while pressing a lever at the left of the head of the machine. The sixteen keys are so arranged that they can be reached and operated in pairs, so that one finger can press down either one or both keys of each pair. At work the palm of each hand rests upon the outer shifting keys, the little fingers upon the next shifting keys, the third, second, and first fingers in order upon the next keys, and the thumb upon those which are clustered at the front of the centre of the machine.

It is not contended that accurate spelling can always be done, or that writing can be produced which would do for correspondence; but it is always possible to do phonetic spelling, and at each stroke to print either the whole of a word or a great part of it. The printing apparatus is simple. The type is cast on segments of a circle, like those used in the Hammond typewriter, but very much smaller. These segments lie just over the back ends of the keys, with one line of letters over each key. The shifting keys merely turn these segments to expose the proper line of type, and then when the keys are pressed they bring the paper and ink ribbon up against the type and make the imprint. With each movement the paper is fed forward the width of a line. Mr. Anderson says he had made three or four of his machines and put them in use in business offices in this city, and that girls who have been operating them only a short time are now able to write more than 100 words a minute. It will be evident to any one that one great advantage which such shorthand notes have over the ordinary ones is that any person can read and transcribe them, and that half a dozen typewriters might be kept busy writing out letters which one operator on the shorthand machine could take notes for. Mr. Anderson believes that his invention will find its most useful place in offices, but he says it could be used also for taking speeches and for other work for the press, and that in the case of late copy a very good compositor could set up the matter from its record.

In Jersey City an inventor is at work perfecting a word typewriter, which is as different from Mr. Anderson's as one machine can be from another. Instead of being satisfied with crudely spelled and irregularly printed matter, the Jersey inventor is making a machine which will turn out finer work, better printed and better spaced, than can be produced on any single letter typewriter. To do this he employs, instead of the extremely simple devices of Mr. Anderson, a system so complicated that it would be almost impossible to describe it clearly in words alone. In appearance it is not unlike a checker board. Its top is about 16 inches long and 12 inches wide, and this is divided into ninety-six oblong spaces. Each of these spaces is a key, and each key contains six words, or five words and a letter or figure, which it is capable of printing. The words are arranged down the board in alphabetical order. At the front of the keyboard are five shifting keys, upon which rest the fingers of the left hand. Each of these keys is marked with a particular color. If you touch any key on the

board without touching a shifting key, it prints the letter or word that stands first upon the key. The pushing of the first shifting key brings up the second word on each key, and so on with each shifting key and set of words on the keys, while at the same time a color like that of the shifting key shows beside the words on the keys to make the operator sure that he is getting the word of the series which he wants.

The words are printed from single type set in place for each operation, and the paper is fed forward automatically each time for just the number of type spaces used, and then for one more to make the space between the words. With this machine, the inventor says, correspondence or other work can be taken from dictation like shorthand work and written out in a finished form at one operation. Of course only the words which the machine has been prepared to make can be printed, except by spelling them out in single letters as at present, but the inventor says his machine contains more words than one ordinarily uses for business correspondence. "While I was making the machine," he said recently, "I began to gather up business letters from many sources. I got letters which related to as many sorts of business as I could, and I got hundreds of them. Then I analyzed all of these, sorting out and cataloguing the words I found. It will probably surprise you to learn that I found that 90 per cent. of all the business letters of the country can be duplicated with a use of only 135 separate words. That, however, is a fact. Now in my machine I have nearly 600 separate words and characters, and these are enough to enable a person to write upon any but a technical subject without having to spell out a thing except names of persons and places."

Undoubtedly other inventors are at work upon machines for purposes similar to these, and people may hope within a few years to have a pocket device which will save them nearly all the work of writing and spelling.—*New York Sun.*

### Cost of a Railroad Car.

THE auditing department of a great American railroad corporation rivals in respect of its records and transactions a Government department. The earnings of all the lines of the Pennsylvania Railroad system in a year average about \$130,000,000 and the gross earnings of the Vanderbilt system amount to rather more—\$45,000,000 from the New York Central, \$21,000,000 from the Lake Shore, \$10,000,000 from the West Shore and Nickel Plate, \$33,000,000 from the Chicago and Northwest, \$13,000,000 from the Michigan Central and about \$15,000,000 from collateral lines or systems. These figures are large, but they appear still larger when they are compared with items of Federal revenue. The total receipts of the United States Government from customs during the fiscal year ending in 1896 were \$150,000,000 and from internal revenue taxes \$146,000,000. The two together made up \$296,000,000 of public revenue for the government of the affairs of a nation of 75,000,000 inhabitants, but the two railroad systems referred to represented together receipts of \$275,000,000, and if a third big railroad system were added the receipts of the Federal Government would be exceeded.

The accounts of big railroad corporations require care and much hard work, and the system of precise bookkeeping in railroad accounts (now a special branch of accounting) has been carried close to the point of perfection by the Pennsylvania Railroad, which, for instance, gives to the fraction of a cent the expenses incident to the construction of a car or a locomotive. There are 30,000 passenger cars and 8,000 baggage, mail and express cars in actual use on the railroads of the United States, and the ordinary passenger car costs anywhere from \$4,000 to \$5,000, the difference representing added improvements in furnishing.

There has recently appeared a detailed statement of the cost of constructing at the Altoona shops of the Pennsylvania Railroad a sample first-class, modern, up-to-date, luxurious passenger car, and some of the items are of interest. The wheels and axles represent a cost of \$332.35; the trucks upon which the car rests cost \$533.62; the air brake represents \$131.75; the seat fixtures—twenty-five in number—cost \$50.50; the three bronze lamps, \$13.50; the two gas tanks, \$84; the chandeliers, \$50.72, and the item of screws, which might not appear to be an important one, \$51.88. For the building of a car like the one taken in illustration 2,480 feet of poplar wood, 3,434 of ash, 1,100 of white pine, 2,350 of yellow pine, 450 of hickory, 400 of cherry, 700 of Michigan pine, 500 of oak and 439 of maple veneer were required. To build the car there were required in addition 13 gallons of varnish, 45 pounds of glue and nearly 3,000 pounds of iron, exclusive of 800 pounds of iron castings. For the furnishing of the car there were required 69 yards of scarlet plush, 44 yards of green plush, 61 yards of sheeting and 243 pounds of hair. The springs on the car seats cost \$43.17. The basket racks cost \$77.35, the sash levers \$42, the bronze window lifts \$24.40, and the gold leaf for the embellishment of the woodwork \$14.58. For the window fasteners \$15.47 worth of material was required, two stoves cost \$77.56, and the tin used on the roof of the car \$41.44. The labor in the construction of the car represented a cost of \$1,263.94, bringing up the expenditure to more than \$4,400.

"QUITE recently," says the British consul at Trieste, "American pig-iron of excellent quality has been imported and sold at prices so low that it is difficult to understand how any profit can be made by the importers. Most of it has come in subsidized Austrian vessels carrying cotton, and it has been said that the fact of the subsidy and light cargo accounts for its cheapness, as it is practically carried as ballast. This theory, however, cannot cover the whole question, as much of the iron also arrives in unsubsidized British steamers. Of course prices may rise, but meanwhile it is said that large stocks from the United States are being laid in by the firms chiefly interested in Trieste."





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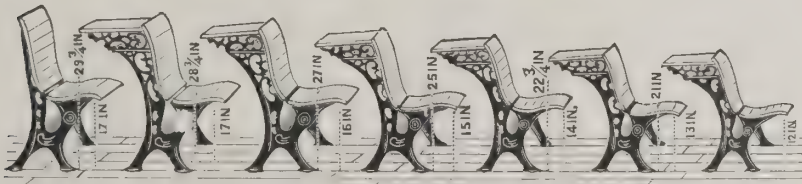
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FOR THE PRESERVATION OF THE  
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Gentlemen—I have great pleasure in recommending Woolsey's Copper Best Paint. I have used it on my Company's steamers for a number of years past, and it has given entire satisfaction. The Devonport Ferry Company's steamers "Britannia," "Victoria," "Alexandra," "Takapuna" and "Tainui" are now coated with Woolsey's Copper Paint over Metal Sheeting.

Faithfully yours,  
ALEX. ALISON, Manager.

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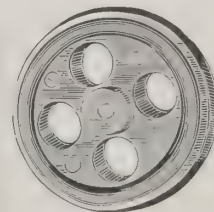
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Yours truly,  
MAY & BARNEY.



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Replace wheels on your trucks with these noiseless ones.

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Write for 100-page catalogue of HAND CARTS, TRUCKS and WHEELBARROWS.

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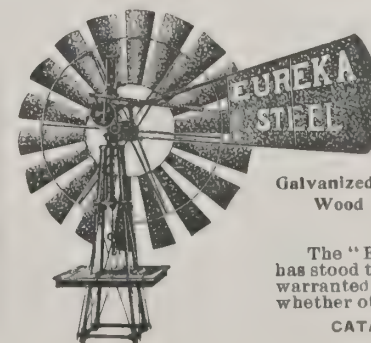


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### The Gigantic Yerkes Lens.

THE Yerkes lens, the making of which has been followed with great interest by all connected with optical science, has at last been sent to its destination, the Yerkes Observatory, near Lake Geneva, Wis., from the shop of its maker in Cambridge, Mass. The greatest possible precautions were taken in the transportation of the lens, guards being placed at both doors of the special parlor car which it occupied. It was accompanied by the maker, his foreman and another workman. The lens has been completed and awaiting shipment many months, the delay being due to the fact that the observatory near Lake Geneva, Wis., built by C. T. Yerkes, its purchaser, was not in readiness to receive it.

The Yerkes lens is the largest and finest in the world. It represents nearly six years of careful labor, and completed is valued at \$60,000. The glass came from the factory of Mantois, in Paris, France, in May, 1892, and its cost in the rough was \$20,000. For the work of grinding and polishing, which occupied the larger part of the five years it has been in the factory at Cambridge, \$40,000 was paid. The lens is 41½ inches on the surface and weighs 515 pounds. The exposed surface, or aperture, is 40 inches, the other 1½ inches being taken up by the casing. This makes it just 4 inches larger than the Lick telescope lens, which was the work of the same makers, and has up to the present held the place of honor in the world of astronomy. This great lens consists of two separate lenses of different density and shape, separated when in use by a space of several inches. The outer one, which comes in contact with the atmosphere, is made of a perfect piece of crown glass. It is double convex, 2⅜ inches thick at the centre, ¾ inch thick at the edge and weighs 205 pounds. The inner lens is made of flint glass and is plano-concave. It is 1½ inches in thickness at the centre, 2 inches at the edge and weighs 310 pounds. Both lenses are adjusted in an iron ring and cell, and the total weight of the glass and iron casing is 1,000 pounds. The focal distance of the lens is 61 feet. The glass disks for these lenses were cast in Paris, and a year was taken up in preparing the metal and casting a dozen or more before a perfect one was secured. Even then it had to be cut and recut before all the air bubbles and inequalities were carved out of it. When they arrived at Cambridge they were rough and crude, with very little shape to them. The greatest care, skill and patience were expended in the grinding.

When the glass was removed it was first tested for strain. It was set on edge in the middle of a long, dark room with a light at one end and the examiner at the other. An assistant held the lens between the light and the disk, and the rays as they were intensified upon the disk magnified any imperfections. The glass was next tested for polarized light, being viewed in the outer light through a revolving nicol prism. Having stood these tests the glass was ready to be shaped. The two essential things at the outset in making a telescope lens are the specifications of the diameter and length of focus. The problem is to determine what curve to give the glass in order that every ray of light which strikes the specified surface may be refracted to a common point at precisely the required focal distance. Then the lens underwent the process of shaping—a job that required months of time.

When completed last Fall the lens was mounted in a temporary telescope tube and tested for fifty nights. It was found to be perfect. Had there been a deviation of a spider's strand it would have been useless. With even one spot or bubble in the glass as small as the point of a pin the largest celestial bodies would be hidden behind it. While the maker and his assistants have not worked continuously upon these lenses since they were received in Cambridge, five years ago, yet there has been little time when something was not being done in perfecting them. They have been kept at night in a fireproof brick annex to the works, and a watchman was at all times, both day and night, in close proximity.

The pedestal and mountings of the lens have within a few weeks been placed in position and the huge dome completed. Theoretically the Yerkes telescope will be one-fourth more powerful than the great Lick—that is, it will collect one fourth more light—and will consequently penetrate one quarter further into space. The Yerkes Observatory, which is a gift to Chicago University, is understood to have cost thus far nearly \$200,000, and when completed and equipped with the largest telescope in the world it is estimated will represent an outlay of nearly \$500,000.

### Rope Drives.

NOT a little interest has been created among manufacturers of textiles by the improved mechanical equipment introduced in the new Whitman mills, New Bedford, Mass. The engines are pronounced remarkable in every respect. They are of the upright type, totally unlike anything in use in American cotton mills, are said to show great efficiency and, though so ponderous, are run more quietly than three-fourths of the engines in the mills of the country. The engines are characterized by the peculiar distinction of having an open rope drive, a feature which has attracted considerable attention. The face of the driving wheel is about nine feet and is cut in grooves some four inches from centre to centre. The ropes sink into these grooves and are covered with a preparation made for preserving them, the covering to be applied, say, once a year. Cotton is the material of which these ropes are made, and although they have been run steadily for more than a year no trouble has thus far been experienced and the drive is pronounced the most nearly noiseless one that has ever been devised. One point of preference expressed in favor of this arrangement is that in damp weather the drive acts so differently from the ordinary leather belting, inasmuch as it shrinks instead of growing flabby and slipping.

### The Dennis Fluorometer.

EXPERIMENTERS in X-ray work will welcome the apparatus which has been perfected by Mr. John Dennis, of Rochester, N. Y., and which has been called the fluorometer.

Mr. Dennis was one of the earliest to recognize the characteristic distortion of the Röntgen shadow and set about devising an appliance which would make certain diagnosis of the presence of bullets, needles, calculi or other foreign objects which are more impermeable to the X-ray than the tissue of the human organism.

Very early in the history of the X-rays it was realized that it could be made a very valuable adjunct to surgery. At the same time, however, there came the disappointing conclusion that no matter where a Röntgen ray picture apparently located a bullet, a needle or other foreign object in the human body, it was frequently not where it appeared to be.

Mr. Dennis' appliance establishes a definite cross section of the body by means of an angle piece which is impermeable to the rays. The fluorometer is so constructed as to fit any portion of the human body, neck, arm, limb or trunk, thus enabling the observer with the fluoroscope to determine the exact location of the foreign object.

It must be remembered that all that is produced by means of the Crookes tube is a shadow. The object of the fluorometer is to enable the surgeon to control this shadow and produce an accurate right angle by taking two views, the foreign object being located at the point of coincidence.

Early in his experiments Mr. Dennis discovered that the distortion in a Röntgen ray photograph was as one to thirteen in the distance of twenty inches; this distortion is corrected by the fluorometer. Incidentally the fluorometer demonstrates that the source of the energy is at the centre of the platinum plate which forms the anode of the tube. The fluorometric appliance is brought within the parallelism of the rays until it shows a single characteristic straight line on the field of the fluoroscope. By means of what may be called sights a cross section of the subject is brought absolutely in line with the foreign object under observation, with the result that a second view by use of the sight discloses the exact location without the necessity of a long exposure required for the taking of a picture.

By means of a simple adjustable table Mr. Dennis controls the character of the Röntgen shadow. The table is provided with an aperture by means of which the second view is taken from below the same as from the side. The metallic grating enables the observer to measure the distance from the base line to the foreign object at a glance, the meshes of the grating being exactly one inch apart.

### Powerful Light for Barnegat.

BARNEGAT LIGHTHOUSE, on the extreme eastern coast of the Jersey shore, will soon flash the most powerful light displayed anywhere on the American coast, which at once places this station among the leading in the lighthouse service of the world. Mariners have always regarded it as the most important point to be well lighted south of Fire Island, as the majority of the commerce bound up and down the coast invariably pick up the light going either way. It is now one of the first-class lights of the country, and shows a white light that can be seen twenty two miles out at sea in ordinary weather. The lighthouse service has now determined to remove this light and substitute the most powerful lens ever constructed and designed to gather up the electric rays and throw them seaward a distance of at least one hundred miles. These rays will strike the horizon at the same point where those of the oil lamp meet now, and here they will reflect on the skies, and ships one hundred miles at sea passing the point should easily make out the flashes and estimate accurately their exact distance from the shore.

This new lens has been the property of the lighthouse service since the World's Fair, when it was displayed by the French Government as a part of its exhibit. At the end of the Fair the United States purchased it for \$10,000, and has since been arranging for its use in one of the first-class lighthouses on the Atlantic coast. Two years ago the board directed that it be placed in the Fire Island lighthouse, as this station was then regarded the most valuable to commerce on the coast. An electric plant was established, but later there came a demand for a light vessel six miles south of the light, and this having been placed in position, the board has decided that the big French lens should go now to Barnegat, where it is to be placed early this Summer. The new light vessel building for Fire Island is to be fitted also with powerful electric lights, and eventually all the first-class light stations, like the Highlands light and those at the Capes of Virginia and off Hatteras, will have electricity substituted for oil as an illuminant. The electric light is ten times as powerful, and being reflected on the skies from the point where it meets the water, should be easily discernible treble the distance the oil lights show. The lighthouse officers tell of the ease with which the Needles lights are seen flashing in the Bay of Biscay over 100 miles away, and predict that within a year Barnegat and other important stations will display the most powerful lights in any lighthouses of the world.

—A great number of Americans are said to be now in England or on the Continent, having come over to seek orders. This is particularly the case in the machine-tool trade. One American firm, whose factories are at Cincinnati, is said to be doing a very considerable European business. It has taken an order from St. Petersburg, Russia, of £4,000 value, for some very heavy machine tools, as well as French orders for the same amount. It has also had orders from England, Germany and Sweden.





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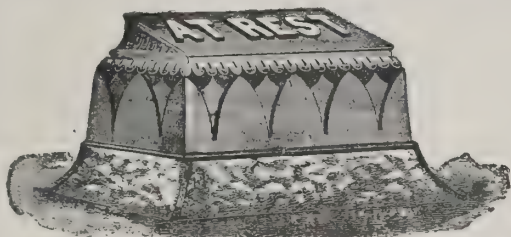
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Grave Marker No. 101. - Base 24 in. sq., height 3 ft. 6 in.

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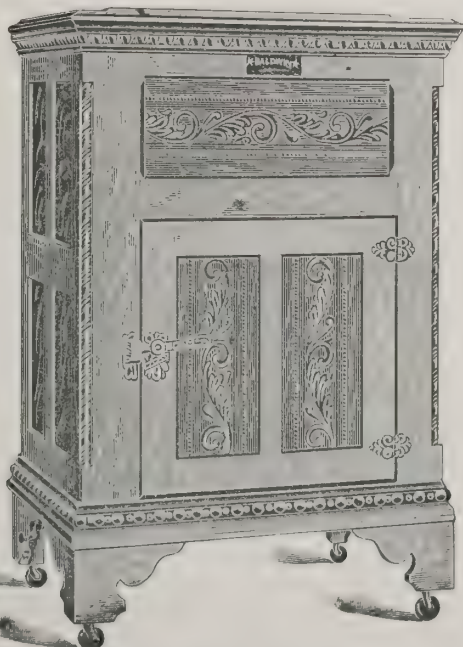
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This Pump is guaranteed to purify the foulest water  
in well or cistern in 10 days' ordinary usage.

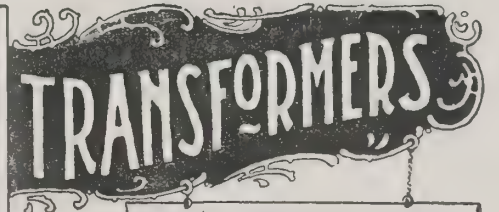
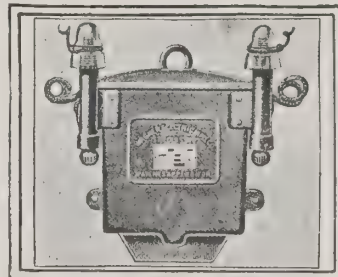
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We guaranteed this Copper Paint to be the easiest to apply and, owing to its being so finely ground, it is the smoothest paint in the market.

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For yachts. Brightest color made.

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A perfect substitute for pitch

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HARRY LOUDERBOUGH, Proprietor,

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U. S. A.

REMARKABLE FACT.

This cut is a copy of a photograph of a board having one end painted with New Jersey Copper Paint, manufactured by Harry Louderbough, proprietor of New Jersey Paint Works, Jersey City, N. J., U. S. A., and placed in the water at Port Royal, S. C., for five months. Upon the unpainted end you can note the ravages of the salt-water worm so destructive to wood, and also the large number of barnacles that have fastened upon it. Observe the painted end, where New Jersey Copper Paint was applied—its splendid condition.

The board here represented was placed in the water at Port Royal, S. C., by me, and left in the water five months. The painted end was as good as when it was placed in the water.

MILLS EDWARD,  
Master Schooner "Florence Shya."





### A Visit from a French Street Railway Engineer.

CHARLES LE BLANC, chief engineer of the Compagnie Generale de Traction et d'Electricité of Paris, spent a day in Chicago recently in search of street railway ideas. Mr. Le Blanc, in spite of his name and prominence in French companies, is of American extraction.

After finishing his education in Washington, D. C., he was placed in charge of the electric plant on the cruiser Atlanta. Resigning this position, he took up street railway work and installed the first electric road in Boston. He has also had experience in operating roads in Boston, St. Paul, Minneapolis, Portland and other American cities. He is now chief engineer of the largest electric construction company in France and consulting engineer for several others.

At the present time street railway work is receiving a great impetus in France, in fact, all over Europe, for the people are becoming awakened to the blessings of rapid transit. The Compagnie Generale de Traction et d'Electricité alone has thirty-one franchises granted in as many cities in France, with a number of others pending.

It is the policy of this company to build and equip the railways and either guarantee the operating expenses or run the roads for the profit derived from them. American methods have been carefully studied and every detail of power house and railway economy worked out. The guarantee is 5c. per car-kilometer and some of the roads have gone as low as 3.6 cents. Condensers are used in all cases, cooling tanks catching the water, sprayed by centrifugal pumps and used over and over again in the boilers. In a 900 horse-power station in Paris only 5 to 6 cubic meters, or about 500 gallons of water, are consumed per day. Coal costs \$4.50 a ton and every device is used to make its consumption economical.

The problem that brought Mr. Le Blanc on his flying trip to America was the rule in some of the French cities that there should not be a drop from the end of the track to the station of over five volts. Believing that this requirement could be met by the three wire direct current system he has been to St. Louis to study operation there, and is going to Bangor, Me., in search of further facts. During his journey he left an order for forty tons of trolley wire, part of which is to be used in the Brussels street railway, running to the Exposition. There will be eight miles of double track upon which forty cars will operate.

### Mastodon Locomotive for Brazil.

A LOCOMOTIVE of the mastodon type has recently been built in this country for the Brazil Central Railway. It is a twelve-wheeled freight locomotive, with cylinders 21 inches in diameter by 26 inches stroke. There are eight coupled drivers, loaded to 142,000 pounds, and a leading truck carrying 28,000 pounds. The weight of the tender is 82,000 pounds, the total weight of engine and tender, in working order, being 252,000 pounds.

The boiler is 5 feet 8 inches in diameter, the fire box being 38½ inches wide by 114 inches in length. There are 248 flues, 2¼ inches in diameter by 13 feet 10½ inches in length. There are 209 square feet of heating surface in the fire box and 1,991 square feet in the tubes, or a total of 2,200 square feet. The grate area is 29 3-10 square feet and the boiler pressure is 180 pounds.

Water is fed to the boiler by injectors and by feed pumps worked from the crossheads. With few exceptions, this locomotive conforms to the standard American Mastodon type, the chief difference being in the width of the gauge, 5 feet 3 inches, and the use of a pair of buffers above the pilot and on the rear of the tender. Another peculiarity which will be noticed is the use of three head-lights, two of which are located at the base of the smoke box.

The hauling capacity of these locomotives on a straight, level road, at ten miles an hour, is about 5,073 tons, exclusive of the weight of the engine and tender.

### Subaqueous Tunnel.

THE term subaqueous pipe tunnel is applied to a recent device brought forward by E. F. Sanford, of Merced, Cal., and designed to overcome a well-understood engineering difficulty. It is of the class of pipe tunnels or conduits employed for conveying liquids or gases, or transporting messages and goods, or the passage of vehicles, such tunnels being laid under the water to rest upon or in the bottom. It consists essentially of flexibly joined sections; a continuous flexible line secured to each section and crossing the joint so as to connect them together; coupling sections telescoped in the adjacent ends of the main section and of sufficiently smaller diameter to permit the main section to bend out of line; bands of flexible waterproof material encircling the joints exteriorly and fastenings on the main sections consisting of fixed and movable jaws which engage the continuous cable that flexibly connects the sections together. In conjunction with these are controllable nozzles in each section with pipes leading thereto, by means of which water may be introduced and ejected against the bottom so as to adjust and grade the line of the tunnel or conduit. This plan is claimed to be applicable to any river or body of water where a bridge would be a hindrance to navigation or where the nature of the soil would render a bridge foundation quite costly.

—About three months ago it was reported that President Diaz, of Mexico, had ordered a private railroad car from a leading American manufacturer. Upon investigation the manufacturers said that they had only submitted bids. It is now reported that the Pullman Car Company had been awarded the contract to build the President's private car, which will cost \$40,000.

### The Production of Aluminum.

THERE is a rapidly increasing use of aluminum in the manufacture of household utensils which recent reductions in price have greatly stimulated. These household utensils are said now to be cheaper than nickel-plated brass. A great deal of aluminum is used in the manufacture of various alloys, in some cases only a very small percentage of the metal being used, while in others the percentage of aluminum is very considerable.

The total production of aluminum in America in the past six years has been as follows, with its total value in each year:

Year.	Pounds.	Value.
1891.....	168,075	\$126,056
1892.....	295,000	191,750
1893.....	312,000	202,800
1894.....	817,600	490,560
1895.....	900,000	495,000
1896.....	1,300,000	520,000

The output has been steadily increasing, without setback in any one year, notwithstanding depression in general business; but the values have not quite kept pace with the quantities, as the price per pound has been steadily reduced. For 1896 the average price was 40 cents.

The production in the United States has been somewhat over one-third that of the world. The principal European producer is the Aluminium Industrie Gesellschaft, with works at Neuhausen, Switzerland, and controlling the Societe Electro Metallurgique de France, with works at Froges, in France. In 1895 the Neuhausen works turned out about 650,000 kegs and the Froges works about 100,000 kegs. The British Aluminum Company, using Irish bauxite, has been making extensive preparations and will now appear as a producer.

### Compressed Air as Motive Power.

THE attention of inventors has been so concentrated on electricity and its possibilities that compressed air, which is almost as wonderful in its capabilities, has been quite lost sight of. Just what it is capable of we cannot as yet understand, but we do know that it runs locomotives, transfers the United States mails, hurls the charge of an explosive a mile and a half with a force sufficient to pulverize a regiment. It operates block signals on railroads, loads guns, drives machinery, works pumps and carves out all sorts of beautiful things from stone and marble. It is coming into use for thousands of minor purposes.

As a cleaning and dusting agent it is invaluable. It copies letters, shears sheep and is used in the stock yards to slaughter and dress meat. As to its future, prediction is made that it will clean house, run dumb-waiters, take the place of a horse as the means of locomotion, will wash dishes and rock the baby. There are inventors who declare that compressed air is already quite as useful as electricity, and much safer and more manageable. To bring it into its best uses large distributing stations must be built from which compressed air will come as we now get gas and water. There will, no doubt, be a sharp rivalry between the two great powers, electricity and compressed air, and between the two we ought to be able to get most of our minor services well and cheaply performed.—*New York Ledger*.

### English Steel Syndicate Here.

WHEN Arthur Pilkington, the English tube king, accompanied by other capitalists, visited Toledo a few weeks ago the information leaked out that he was seeking to acquire the controlling interest in the American Weldless Steel Tube Company, a large portion of whose stock is already held in England. Soon afterward it was learned that the Ellwood City and Greenville, Pa., plants were also in the deal, but all persons concerned were so reticent that no credence was given the report.

Additional details have come to light to-day and the deal turns out to be much greater than was at first supposed. It will practically place every steel tube mill in America under British control. In addition to those already named the plan will include the mill at Shelby, O., which was the foremost in America, and the mill at New Albany, Ind., owned by the bicycle magnates, Gormully & Jeffrey. The two Pennsylvania mills are owned by E. A. Lozier; Samuel Snell of this city is the ruling spirit of the American Weldless and these two gentlemen, together with W. E. Miller of the Shelby concern and Philip Gormully, are now on the ocean on their way to complete the deal. The syndicate will control seven-eighths of the American cold-drawn steel tube output, together with the famous Steifel patents, which have given the American mills a decided advantage over the English factories.

### New Type of Multipolar Motor.

WITH the view of a simple, serviceable and economical dynamo for use in central stations and isolated plants, a new York company has signed a slow-speed, direct connected six-pole generator, which is said to satisfy all requirements.

The magnetic frame is of soft, magnetic steel, with the magnetic pole so designed as to insure proper flux density in the air-gap under all conditions of load, and the field coils are reinforced to avoid injury by handling. The brush-holder is of the well-known C and C reaction type. A rigid support is provided from the hub of the armature wheel for the commutator, making it possible to remove the armature and commutator from the shaft, and the bearings are self-aligning and self-oiling throughout. The other elements in the machine are those which would attract a practical engineer.



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Prices depend upon thickness and quality.

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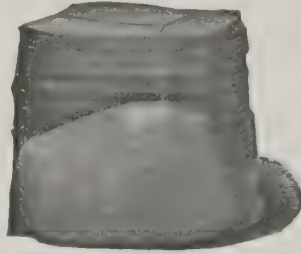
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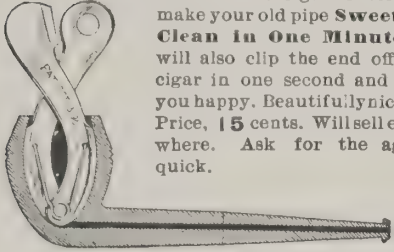


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	5 " " " " " "	1.80 " " " "	2.10 " " " "
Good	4 1/4 " " " " " "	1.62 " " " "	1.80 " " " "
	4 " " " " " "	1.50 " " " "	1.70 " " " "
	3 1/4 " " " " " "	1.38 " " " "	1.58 " " " "
Medium	3 " " " " " "	1.26 " " " "	1.46 " " " "
	2 1/4 " " " " " "	1.14 " " " "	1.34 " " " "
	2 " " " " " "	1.02 " " " "	1.22 " " " "
Coarse	1 1/4 " " " " " "	.90 " " " "	1.10 " " " "
	1 " " " " " "	.78 " " " "	.98 " " " "

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Our **DIAMOND** Steel Combination Pipe Cleaner and Cigar Cutter will make your old pipe **Sweet and Clean in One Minute.** It will also clip the end off your cigar in one second and make you happy. Beautifully nicked. Price, 15 cents. Will sell everywhere. Ask for the agency quick.



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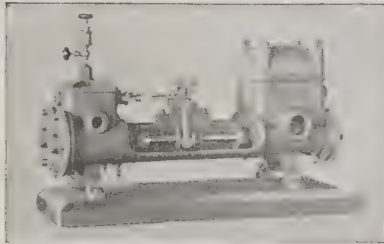
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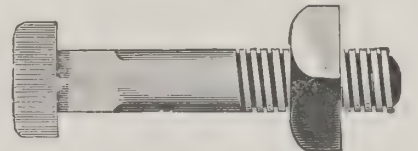
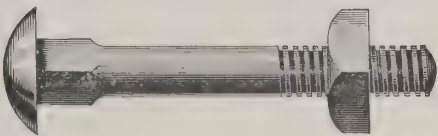
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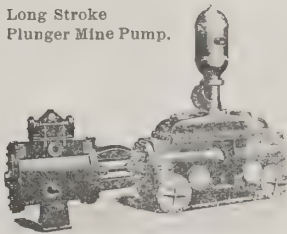
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**No. XX Press** prints cards, circulars, etc., up to 5x8 inches. Complete with 7 styles type, ink, etc. Price, \$40.00. This outfit is entirely complete, ready for use.

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MOLINE, ILLINOIS, U. S. A.

PLOWS, HARROWS, CULTIVATORS,

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Wood Beam or Steel  
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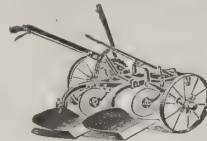


Moline Champion  
Corn Planter.

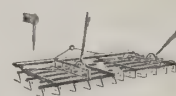


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SULKY PLOW.

Any Size  
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Moline Pipe Lever  
Harrow,  
from 10 to 24 feet cut.  
In sections.



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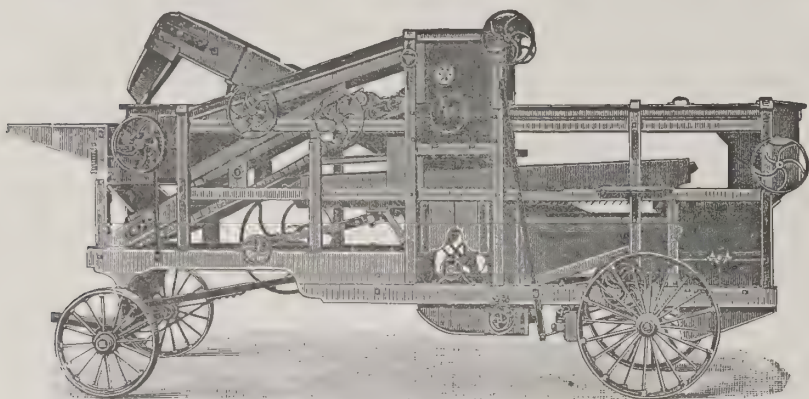
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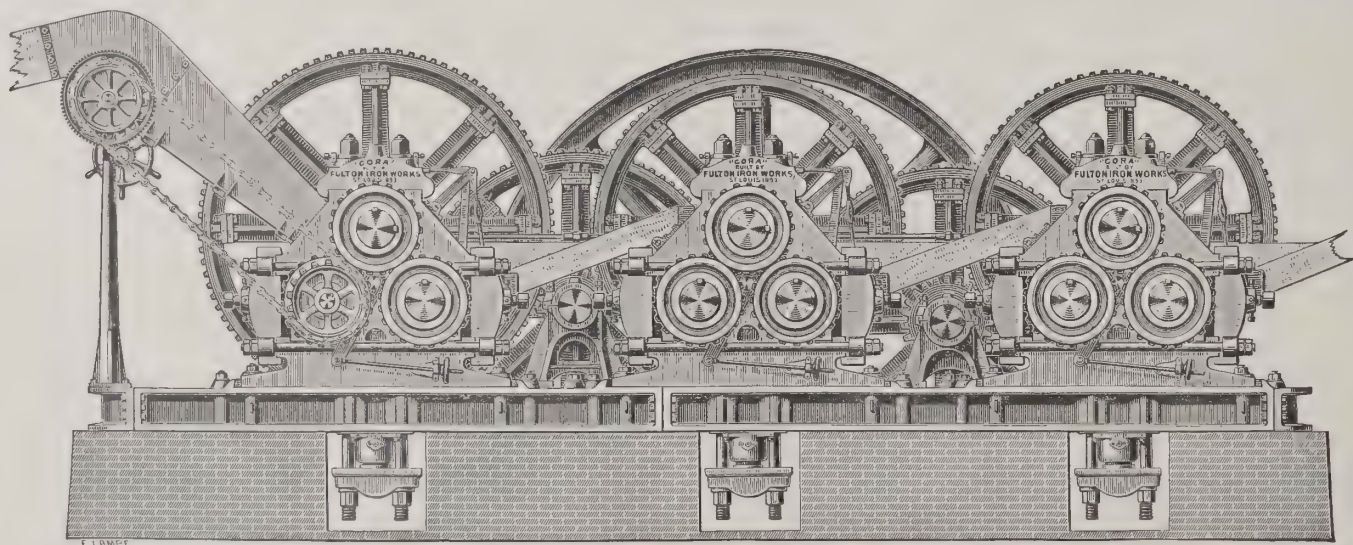
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Write us for DETAILS, PRICES and ANY DESIRED INFORMATION.

## “CORA” Nine-Roller Cane Mill.

CORRESPONDENCE SOLICITED.



ESTIMATES FURNISHED.

Built by “FULTON IRON WORKS,” St. Louis, Mo., U. S. A.

Per S.S. “COPTIC”

FULTON IRON WORKS, St. Louis, Mo.

HONOLULU, H. I., June 17th, 1895.

Dear Sirs: The nine-roller mill and Corliss engine built and erected for us by you last year has given perfect satisfaction, and we take pleasure in furnishing you with the following report covering work performed by it during the season just closed. Days grinding, 104 $\frac{3}{4}$ ; Tons of cane ground, 61,617.928; Tons of cane ground per day, 588.238. Extraction: 92.49 per cent. total sugar; 82.13 per cent. of cane; Dilution, 7.91 per cent.; Fibre in cane, 11.02 per cent. Average load on hydraulics, 313.2, 334, 344.5 tons.

It is hard to say just what is the capacity of this mill, as our boiling house is not of sufficient size to admit of a prolonged test, but we would say that we have ground on a short run over 50 tons of cane per hour, and with an increase of from 50 to 75 tons in the load on the hydraulic obtained an equally good extraction. We believe we have the best mill on the Islands.

Very truly yours,

EWA PLANTATION CO.,

E. D. TENNEY, Secretary.





DEVOTED TO THE FOREIGN TRADE IN AGRICULTURAL MACHINERY AND IMPLEMENTS

## Chicago's Agricultural Machinery.

CHICAGO is the birthplace of the reaping machine. It is the tool factory for the farmers of the whole world. Of all the ramified branches of Chicago's material and industrial greatness there is none that stands out more strikingly and shows greater development than the manufacture of agricultural implements. In fact, Chicago to-day is the centre of the world in the manufacture of these industrial articles and has enjoyed that distinction for more than a decade.

Back in the '40s the first Chicago manufactory of farm implements was established on a very small scale. Plows, old-fashioned hand "cradles" for reaping, and other agricultural necessities, small and large, were turned out by the then snail-like system. The slow but gradual evolution in farm methods and in inventions that improved upon the old order of things, however, offered to the manufacturer wider fields and greater possibilities in this industry. Every need apparently was quickly grasped, and this in time demanded and brought forth greater activity and sharper competition. The industry grew at a marvellous pace, involving greater results as it moved, until to-day it presents to the world a magnificent monument of the achievement of man and his resource of mind.

## BIRTHPLACE OF THE REAPER.

For example there is the reaper, which finds a ready sale the world over wherever grain is grown. It was invented but crudely in 1831. The heavy wheat and grain products of the then West demanded such machines, and in 1847 a manufactory was established in Chicago to make them, as well as other farm implements. It was one of these that found its way to the London exposition in 1851. The English people laughed at it until they saw it work. Then they marvelled.

By 1860 the output of these reapers, improving all the time, grew from 500 to 5,000 per year. The patent expired soon after and the field was opened to all. As a result Chicago became the centre for manufacturing them, together with the thrasher, binder, mower, and other like machines. All have grown rapidly, turning out now more than 3,000 machines daily, to say nothing about the large interests connected with the manufacture of every other conceivable thing that is used in agricultural pursuits. There is not a civilized country in the world that grows farm products but uses Chicago-made implements. In fact, the world is the city's ready market in these things. The reaper saves the labor of six men. It has now been developed into the self-binding harvester, which saves the work of twelve men over the old hand methods.

Something of the great value of the grain and grass cutting machinery to the people of the United States can be figured when it is remembered that more than 60,000,000 acres of grain are harvested yearly, and almost 50,000,000 acres of grass. The cultivation of these acres is made possible only by the reaping machine. It is only by the use of the reaper that the farmers of America can raise grain in competition with the hordes of cheap laborers in India and Russia.

A CALIFORNIA fruit company has adopted an interesting method of drying potatoes, by which they are greatly lightened, so as to be the more available for transportation. By the drying process four-fifths of the weight is removed without lessening the nutritious value of the potato or diminishing its excellence as food when cooked. It is reported that the company engaged in this business will soon have ready for market nearly 1,000,000 pounds of dried potatoes, the original weight of which was about 5,000,000. The idea of drying potatoes for shipment is not novel, but we do not know that it has ever before been carried out upon a large scale in this country. We cannot say how the potato growers of the great potato-growing State of New York look upon it.

California is truly an enterprising State. Its fruit, vegetable and grain raisers have in recent years manifested a remarkable amount of ingenuity in marketing crops of their ranches. They live far away from the centres of population, and they are able to consume but little of their own food products, so that they have to seek for markets, not only in this part of the country, but also in Europe and Asia.

—Representative Wilber, of New York, is actively pushing a movement in connection with W. A. McKnight, a member of the Liverpool and Manchester Chambers of Commerce, who came to America for this special purpose, whereby it is hoped to extend the market for American cheese abroad by rendering impossible fraudulent practices that have affected injuriously the standing of American cheese with the foreign consumer.

## Substitute for Rubber.

W. FALCONER, a well-known Santa Rosa reporter, has just patented a process by which a substitute for india rubber may be made from the gum of a tree indigenous to California soil, says the *San Francisco Call*. A San Francisco syndicate has closed a contract for the purchase of the inventor's rights for a large sum and a perpetual royalty. The substitute has been found to possess many of the properties of pure rubber, but it can be manufactured for a small sum. The invention of a process by which a substitute for india rubber can be made at a low cost will please the commercial world, because the increased use of caoutchouc by modern manufacturers has threatened a famine in the market.

The new substitute for rubber comes from a tree which grows abundantly in California, particularly in Sonoma county. The company that has bought the right intends to establish a factory here at an early date. The new substance resembles vegetable glue and it can be made in large quantities on short notice. Speaking of the matter recently, Mr. Falconer said:

"The gum is procured from a transverse incision in the large root. Under this incision a hole is scooped in the earth in which a leaf is folded like a cup, or else a tin vessel is placed, into which the thin and nearly colorless juice runs. The juice flows rapidly for the first ten to fifteen minutes, and after two or three days' exposure to the air and sunlight a layer of gum is formed over the juice, which is then removed and the crust or layer of gum gradually re-forms.

"The flow of gum is greatest in the Spring and Summer months. From 50 to 100 pounds can easily be gathered each day by one man. For every pound of juice one ounce of a secret composition or solution is added for the purpose of 'curing' and hastening the process of oxygenation. The juice has been found to contain in 100 parts 12.5 hydrogen and 87.5 carbon, the specific gravity being 0.95. The crust that forms over the juice consists of an insoluble base with minute pores containing the soluble parts, which resemble other vegetable glues.

"It will vulcanize readily. Vulcanization is the process of imparting new properties to rubber by causing it to combine with sulphur through the agency of a high temperature. Without vulcanization the manufacture of rubber into durable and useful articles of commerce would be impossible. Sulphur gives greater elasticity to rubber, and when heated is pressed into molds or pressed with heavy rollers. This substance can be produced in any quantity."

## Dairy Produce Genuine in Future.

SECRETARY WILSON, of the Agricultural Department, is working diligently and faithfully to boom American agricultural productions abroad. He learns that the market for American dairy productions, which was excellent abroad a few years ago, was subsequently injured by the exportation of bogus butter and "filled" cheese.

Foreigners soon learned that they could not depend upon the quality of anything in the dairy lines which came in their market in the name of the United States. Now the laws passed by Congress requiring bogus butter and cheese to wear brands showing their true character, it is believed, will restore American products to their birthright.

Secretary Wilson has made a shipment upon his own responsibility, selecting only the choicest factory cheese and creamery butter. The first consignment arrived at Southampton in good condition. A record will be kept of the sales, and effort made to protect makers and consumers against spurious substitutes in the name of United States dairies. As the original packages of oleomargarine and filled cheese have to be branded at the factories, it will be difficult to palm them off for genuine butter and cheese in the original packages.

THE first cargo of grain ever shipped from this country to Egypt has just cleared from Philadelphia. It consists of 137,906 bushels of Indian corn which has been purchased by the Egyptian Government for seed purposes. It will be widely distributed over the country and will be transported to remote interior parts on camels' backs. As we have heretofore had no market for corn in Egypt the production of this cereal there can only affect American interests indirectly by making Egypt a future competitor in the general markets of the world in case Indian corn should prove to be a crop suited to the soil and climate of that distant land. The amount of seed above mentioned will be sufficient to make the test a thorough one.

—One million barrels of American flour went to Asia last year.



### Machine for Making Paper Fruit Cans.

THE machine that makes pins, assort, counts and sticks them on paper, will have to divide honors with this new machine, that makes a complete seamless fruit can from paper pulp. The preparing machine consists of a beating engine for disintegrating the pulp. The soft pulp produced is first placed on fine netting and the moisture driven out by compressed air, the mesh holding the fibre and permitting the water to escape. The pulp, while yet in a soft state, is impregnated with a "waterproofing" mixture, which renders the can impervious to the action of the juices. It is then placed on a row of molds, in which round, hollow plungers act in forming the can.

The plunger is as much smaller in circumference than the mold as the thickness of the can is desired to be, and can be regulated to different thicknesses. And now the extremely ingenious part of the machine is seen. The plunger is hollow and closed at the bottom, with the exception of a central hole about the size of a half dollar. In descending into the pulp-filled mold all the surplus pulp not required for the can is forced by the compressed air up through the hole in the bottom of the plunger, and by it is drawn out for use in the next mold. An ingeniously constructed "shave" or knife works on the bottom of the plunger at the moment of cessation of the downward plunge, to shave off the pulp clean from the centre of the bottom of the inside of the can. Sufficient surplus pulp is forced up around the top of the mold to form the top of the can, which is so formed by a partial return movement of the plunger, forming the top complete, with the exception of the round hole in the center of the bottom of the plunger, which is left in the lid or top of the can to allow of its final filling with fruit, which final closure is made with a pulp disk properly cemented, and one of which goes with each can. The cans are removed from the molds, and in twenty-four hours are "seasoned" and ready for use. Their impervious nature renders them less liable to leakage, and they are not susceptible to the corrosive action of fruit acids, and, taken altogether, are much more desirable than the old tin can.

### American Apples.

THE American apple, says the Philadelphia *Ledger*, is, par excellence, carrying all before it in Austria-Hungary, but the supply, which may be safely chronicled as enormous, in no wise satisfies the demand. There was an overwhelming invasion of the fruit in the European market at the beginning of last Autumn, when the belief prevailed that the transoceanic stranger would last out the Winter. Cargoes, however, continued to arrive throughout the Winter and were snatched up with all dispatch. It is now anticipated that last year's crops will continue to supply the market until this year's crops arrive. Austrian cultivators naturally complain on the plea that, although the home product of last Autumn was extremely scarce, they look to a plentiful harvest this year, which, owing to the inferiority of the home product, will be unable to compete with the superior American imports.

AT the show of the Witwatersrand Agricultural Society which was held recently at Johannesburg, South Africa, a number of American firms won prizes, chiefly in the department of agricultural machinery. Among them were the McCormick Harvesting Machine Company, of Chicago, who took first prizes for a reaping machine and a reaper and binder, and a second prize for a mower, yielding first place to the machinery of Messrs. Osborne & Co., of New York. The latter firm took the second prizes for both the reaping machine and the reaper and mower. For mealie shellers Messrs. Hobson & Son, of New York, took second prize. Among the other prizes awarded were a second for wind pumps to the Challenge Windmill Company, Batavia, Ill. A horse-treadle threshing machine, exhibited by Messrs. Moodie & Co., was highly commended.

A TENNESSEE firm has obtained a contract to furnish the Italian Government with 15,000 hogsheads of fine dark tobacco during the coming year. It is said that this amount of tobacco is almost equal to the entire crop of that section of the State of Tennessee. Tobacco merchants and brokers are of the opinion that this transaction was made direct with the Italian Government and without the intervention of the Regie contractors, who heretofore have controlled similar transactions. The total value of this sale is estimated by competent parties to be nearly \$2,000,000. The contract for Virginia tobacco for this government has not yet been closed; it is reported, however, that it won't by any means be as important as this just closed.

IT is reported that an unusually large foreign trade is being secured by a mower and reaper factory, of Akron, Ohio, and that several large shipments have been made to the seaboard to go forward to European grain and hay fields. In the past few years more than 1,000 reapers and mowers have been shipped, and this does not include the duplicate castings and other parts. A large business with South America and Australia is expected for the coming Fall, at which time shipments are made to those countries.

"WE have received," says the *Textile Record*, "from T. A. Jackson, Atlanta, Ga., samples of his now famous cotton, which grows upon a single stock with few or no branches, the seed being a product of Egyptian soil. We have been unable to get any positive knowledge in regard to this so-called new variety of cotton. Mr. Jackson disclaims that it is the Bamian variety, which we have been inclined to think it is, but something entirely distinct from it. Mr. Jackson claims that the cotton is a genus of itself."

### Agricultural Notes.

—Recent reports show that the exportation of the American peanut is increasing rapidly.

—Nearly three million barrels of apples were shipped to Europe this season against 736,000 last season. The business is becoming a very satisfactory one.

—There was recently shipped from Brunswick, Ga., to Stettin a cargo of 5,500 tons of phosphate rock, valued at \$25,000. Other large shipments are to follow shortly.

—The British steamship *Viola* has just sailed from New York for Archangel, Russia, loaded with corn. Her cargo is to be shipped to the Siberian exiles by the Russian Government, the actual purchasers.

—Russia has sent to the United States a commission to study the uses and advantages of American agricultural implements. Russia is a great agricultural country, but it is far behind the times in the matter of assistants to manual labor.

—M. A. Andry, of Boulogne, France, has recently been a guest of a manufacturer at Canal Dover, Ohio. M. Andry is one of the most extensive manufacturers of carriages and turf goods in France, and is in this country on a tour of inspection of the various industries in his line.

—The sum total of the corn shipped for foreign ports on a single day recently from the port of Philadelphia, Pa., amounted to 506,762 bushels. This would require twenty freight trains of twenty-five cars, each loaded on an average with 1,000 bushels to transport it from the West to the port.

—The representatives sent by the Russian Government to investigate the advantages of American agricultural implements and machinery have been in Chicago recently. There are three in the party, and, it is said, that upon their investigation depends the development of quite an export trade in that line. At present Russia is buying a great deal of her agricultural implements from Germany; but according to advices the Empire Government is not altogether satisfied with the results obtained from these implements, and is anxious to change.

—Karl G. Corn, until recently the manager of the beet sugar factory at Menomonee Falls, Wis., said recently, that a company of foreign capitalists had been formed which would manufacture beet sugar on a gigantic scale in Illinois, Wisconsin and other States. He said that all of the men whom he had succeeded in interesting in the matter were men who have had a wide experience in the business in Europe. He said: "The main business office of the company will be in Chicago, and branch offices will be established and placed in charge of experts in every sugar beet-growing State in the Union."

—The first load of horses which ever left Southern Pennsylvania for England was shipped from Philadelphia recently consigned to George A. Ensor, London. The two carloads were made up of heavy draft horses intended for use on the streets of London, and were ordered on a special trial to see if American horses could stand London street work. The horse dealers of the Cumberland Valley await with interest the result of this experiment, and they confidently expect that the opening of this European market will give increased value to the enormous overplus of horses in the Eastern part of the United States.

### Swedish Engineer Examines Our Ice Crushers.

THE ice-crushing ferry steamer *Sainte Marie* has been inspected at the Detroit dry-dock by Lieutenant Fredrik Enblom, engineer corps, Stockholm, Sweden, who has been sent to this country by the Swedish Government to make a personal investigation into the merits and peculiarities of such vessels, and incidentally to examine some American canals and locks. Lieutenant Enblom came to this country about a month ago. He first went to Washington and then to Detroit via the St. Lawrence, Erie and Welland canals. The *Sainte Marie* was especially on his list, that vessel having quite a European reputation. From Detroit he will go to the Soo, stopping at Mackinaw City, to see the steamer *Saint Ignace*; and from the Soo proceed to Chicago, making an investigation of the ice crushers on Lake Michigan on the way. After seeing the Chicago drainage canal he will make a hasty trip to one or two Mississippi River points and then return to Sweden. "A line of ice-crushing ferry steamers is projected across the Baltic, from Sweden to Germany," said Lieutenant Enblom, "and I have been sent here by the Swedish Government to examine this boat and some others on Lake Michigan. I wish especially to see the locks at the Sault also."

THE *Railroad Gazette*, in discussing the foreign trade of the country, has the following paragraph: "A very useful fact for statesmen and editors to keep constantly before their minds is that the United Kingdom is by far the best customer we have in the world. Of all our exports that country took 45.97 per cent., Germany came next, taking 11.1 per cent., and Russia took only 0.84 per cent. All of North America, including Canada, the West Indies, Mexico and Central America, took only 13.21 per cent. of our exports, and all of South America took but 4.11 per cent. Asia, Oceania and Africa absorbed but 6.32 per cent. of our total exports. That is, the United Kingdom took more than four times as much of our exports as any other one country and seven times as much as any group of countries outside of Europe and three and one-half times as much as all North America, including the West Indies and the Central American States, and more than eleven times as much as all South America. In fact, the United Kingdom and the British colonies took 57.39 per cent. of all our exports."



THE CASE GRADUAL  
REDUCTION MILL.  
MACHINERY, ROLLS,  
PURIFIERS.  
FLOUR DRESSERS,  
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Belt, Steam, Hand Power and Electrical  
CRANES,  
HOISTING MACHINERY  
AND  
APPLIANCES.

All Sizes of  
HOISTING AND WHEEL  
CHAINS.

THE CASE MAN'F'G CO.  
COLUMBUS, OHIO, U. S. A.

## COFFEE MACHINERY.

The Monitor Coffee Separator and Grader

Will make clean separations and grade in one operation.

The Monitor Coffee Milling Machine,

The most perfect miller for coffee ever offered. It will do the finest work on tender as well as hard coffees, and do it without waste or breakage.

These Machines are in successful operation in many of the largest Coffee Houses in this country, and are well worthy of investigation by Handlers of Coffees.

Can be bought direct from manufacturers or through any reliable exporter.

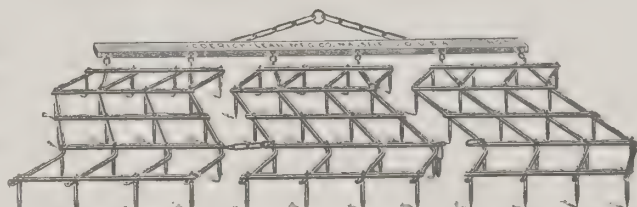
HUNTLEY MFG. CO., Silver Creek, N. Y., U. S. A.

## THE LEAN ALL-STEEL HARROWS



Have been in the Market over 25 years and EXCEL ALL OTHERS.

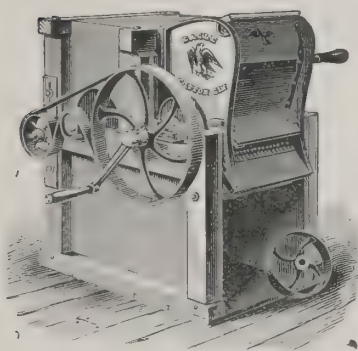
A large variety of Styles, Sizes and Weights suited to the Requirements of any Country. Manner of Packing secures Lowest Rates for Transportation to all Parts of the World. Write for full Descriptive Matter and Lowest Prices. In ordering through Commission Houses send Duplicate Order to us.



RODERICK LEAN MANUFACTURING CO.,

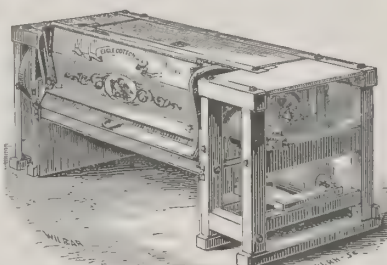
Mansfield, Ohio, U. S. A.

## EAGLE COTTON GINS.

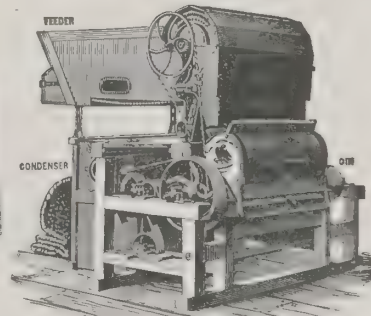


These Gins enjoy a BETTER REPUTATION THAN ANY OTHERS OF THEIR CLASS IN EXISTENCE, and are PREFERRED to all others made, on account of their STRENGTH, SIMPLICITY, DURABILITY, the amount and EXCELLENCE of the work they accomplish, and the RAPIDITY of their operation.

For further details, illustrated Catalogues will be furnished on application.



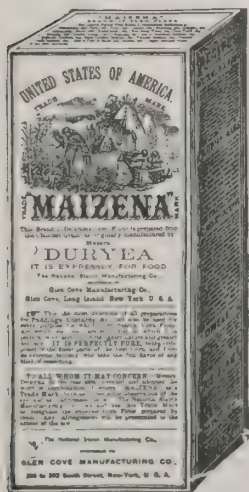
Power Gin with 12-inch Saws.



Power Gin with 10-inch Saws, with Feeder and Condenser.

Eagle Cotton Gin Co. { FORMERLY Bates, Hyde & Co. } Bridgewater, Mass.

Is SUPERIOR to "CORN STARCH," "ARROWROOT," "SAGO," Etc.



TRADE MARK  
**MAIZENA**  
(DURYEY)

This is a brand for a preparation from the choicest parts of Indian Corn, or Maize, making a healthy and nutritious article of food, and a most

**DELICIOUS TABLE LUXURY.**

ITS PURITY AND DELICACY ADAPT IT TO BEING USED IN A GREAT VARIETY OF EXQUISITE DISHES.

### ENCOMIUMS TO ITS MERITS:

LONDON, 1862. "Supremely Excellent."

BRUSSELS, 1876. "Notably Excellent."

PARIS, 1887. "Perfection in Preparation."

CENTENNIAL, 1876. "Notably and Absolutely Pure."

PARIS, 1878. "Best Produced of Its Class."

FRANKLIN INSTITUTE. "Superior Merit."

Gold Medal Awarded  
"MAIZENA."



Paris Exposition,  
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Put up exclusively by THE NATIONAL STARCH M'F'G CO., successor to (Messrs. DURYEY) GLEN COVE MANUFACTURING CO., N. Y. U. S. A., in 40 and 20-pound boxes, in packages of 1 lb. and ½ lb., and may be obtained through all importing houses of South and Central America, and the West Indies, and all export houses of the United States and Canada.

None GENUINE without "DURYEY" appearing on the face of Package.



# ELECTRICAL NEWS.

## Edison on Motors.

THOMAS A. EDISON is credited with having devised a motor vehicle which will be put on the market as low as \$100. When questioned, Mr. Edison said that very cheap motor cars were being made, but denied that he had devoted any time to them.

"Inventing motors," he said, "is too dead easy for me to devote time to it. I have dabbled at such a thing during spare moments, but purely on my own account."

"The thing I am making is to be used on a tricycle to pull me up this hill every day," and he pointed to the steep decline leading through Llewellyn Park from his residence to the laboratory at the foot of the slope. "That, however, is only for my private use. I am building for the purpose a tiny motor that will generate a great power. Yes, electricity, of course, is the force. This motor will be attached to the axle and will be hardly large enough to be noticed at all. That can be done easily, because I only intend using it for this short distance. Where a motor is to serve for several miles it must of necessity be larger."

"The whole problem rests in the construction of cheaper and lighter motors. Over 2,000 men are at work in this country alone trying to invent better motors for horseless vehicles. Hundreds of others in Europe are also engaged in the same task. It is only a matter of time. The automobile is bound to be in general use before long. Take the bicycle, for instance. The high-grade wheels which cost \$100 each to-day will, in a few years at best, drop to \$50, and the machines that can now be bought for from \$50 to \$75 apiece will cost only \$15 or \$20."

"The same thing will be the outcome of the experiments with horseless carriages. The motors now cost from \$250 to \$350 each. The prices will eventually be reduced. The motors will also be made smaller and more easily manipulated. That means that tricycles and light road vehicles can be put on the market at a cost of \$100 to \$125 each. Of course, the cost of the superstructure can be made little or much—just as carriages cost more than buggies—but a serviceable light vehicle, to carry two or even four people, can be made very much after the principle of the tricycle at a cost of from \$100 to \$125."

"In the construction of the motor there are three different kinds of power to consider—gas, petroleum and electricity. Electricity should be the best and cheapest. The most successful automobiles made thus far are those in which electric motors are used. They can go twenty-five miles or more without being recharged, at a rate of ten miles an hour. I expect the horse to disappear almost entirely so far as his use for street traction is concerned. Delivery wagons, busses, express wagons, broughams and all of the heavier class of vehicles can be driven as easily by a storage battery as any other kind, if the battery is improved sufficiently, and that will unquestionably be done."

"Horseless carriages at such a low cost would permit the poor as well as the rich to crowd the parks and boulevards on every pretty day. It is a revolution that is bound to come and at a very early day."

## An Automatic Electric Block Signal.

A New York electric railroad company is introducing a novel and ingenious automatic electric block signal which is said to do away with the annoyances incident to cars going in opposite directions meeting between turnouts. One of the boxes containing the signal is placed on a pole near the turnout at each end of the "block," or section of single track. It has two lenses on each side, the two upper ones having green glass and the two lower ones red glass, with a group of lamps between each pair of lenses. Each box has wires running to automatic contacts on the in and out trolley wires of the switch. Two wires also connect the two signal boxes with each other.

The operation is as follows: The trolley wheel of a car on passing over the turnout to enter the block strikes the corresponding automatic contact which lights the lamps that show the green signal in the signal box at the entering end and the red signal at the other end of the section. On passing out of the block, or section, the trolley wheels strike the automatic contact on the "out" side of the turnout trolley wire, and this shuts off the current from the lamps at both ends of the section. It will thus be seen that this block signal not only indicates at each end when a car is on the "block," but also the direction in which it is moving. The system has been employed for several months on two New Jersey lines, and has been found eminently satisfactory.

At a recent meeting of the Engineers' Club, of St. Louis, Mo., Mr. H. A. Wagner delivered an address upon "The Electric Lighting System of the City of St. Louis." A review was given of the history of the lighting industry in the city, and the present condition was described. Mr. Wagner told how changes are now being made so that all lights may be operated from one kind of dynamo. Twelve hundred arc lamps are being operated from one alternating current dynamo, and the other arc lights are rapidly being changed to operate on alternating current circuits. The plan in operating arc lights is to use step-up transformers, and as many as sixty arc lights are operated in series on one alternating circuit. The same generator may be used for arc and incandescent lighting. Mr. Wagner gave a short sketch of the underground work now being installed. For commercial lights the plan is to use high-tension mains and distribute at low tension on the 220-volt, three-wire system, from transformers placed in the manholes.

## An Electric Motor Carriage.

AFTER three years' experimenting a Connecticut company has finally settled down to an electric motor and storage battery as more practicable than any kind of gas engine for motor carriages. Everything about the carriage is made on a bicycle basis and ball bearings are freely used throughout.

The frame is made of carbon steel, and selected in dimensions that enable it to be used in the annealed state. As a result a better alignment of bearings can be insured. The radius of action of the carriage is something over 30 miles. The speeds are maximum 15, third speed 12, second 6, and first 3 miles an hour on smooth level roads.

The batteries can be charged from 110-volt continuous current, which is the most common circuit in general use in the cities of this country as well as in the plants of manufacturers and those of private individuals. In short it is the most available of currents. The cost of operating at the usual charges for current in the various cities would be about 1¼ cents per mile. From one's own electric apparatus the carriage could be charged for not over ½ cent per mile. The carriages have a meter or indicator showing the extent to which the batteries are exhausted.

It will be seen from this that upon a probable average run of 20 miles a day the expense of operation of these carriages would vary, according to the conditions above cited, from 10 cents a day to 25 cents a day. The difference between the annual expenditure on this basis and the cost of keeping the two horses which would be necessary to maintain the same service certainly represents the interest on many times a greater sum than the difference between \$3,000, the price of each of these carriages, and the cost of any carriage which could take its place, or, for that matter, of the entire price.

In charging the batteries the connection is so made that one wholly ignorant of electric matters can make no mistake, and when the batteries are fully charged they will automatically cut themselves out.

Everything is constructed on a basis for the roughest kind of service, even though finished for the finest. The carriages are entirely available in the most severe weather, and while their radius of action is, of course, necessarily reduced, six or eight inches of heavy snow is no obvious obstacle, and the same is proved to be true of mud.

## Electric Protection of Safes.

THE latest idea for the protection of money and valuables is to have the safe which contains them secured inside a cabinet. Where the safe is kept in a vault the vault serves the purpose of a cabinet. In either case an electric lining is used, consisting of strips of metal mounted in connection with thin metal sheets, so arranged that even a pin thrust through the cabinet and penetrating the lining will sound the alarm. The door of the vault cannot be opened, nor can the curtain of the cabinet be raised until a time-lock has disconnected it from the alarm system. In order that the alarm box may be proof against molestation it is made of steel and placed within a hood lined in the same way as the cabinet. Any attempt at tampering will cause an alarm to be sounded, as in the case of the cabinet. The door is held closed by lag belts, the partial removal of any of which will give a warning signal. There are several of these lag bolts, and before the door can be opened they have all to be removed, which requires a considerable length of time.

## Vacuum Tube Lighting.

AT Newark, N. J., one evening recently, Mr. D. McFarlan Moore gave an exhibition of results obtained by him since last year in vacuum tube lighting, to a limited number of invited guests, consisting of representatives of some daily papers, scientific journals and others interested in the general subject of lighting.

An electrical expert made an address to the guests, explaining some of the features to which he wished to call attention. The light was produced from a number of vacuum tubes strung around the room near the ceiling, occupying about the place of the usual picture molding.

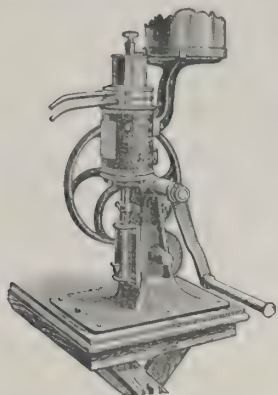
The expert announced that the "vibrator" of a year ago had been replaced by a rotary device, called the "rotator"; that Mr. Moore had succeeded in operating the vacuum tubes in multiple arc; that one rotator and coils transform the current for all tubes of an installation; that the amount of power required had been likewise reduced, and that the quality of the light had been much improved by raising the rate of vibration from 6,000 up to about 50,000 per minute.

Mr. Moore gave a series of experiments with his tubes, aside from the lighting of the room, and before dispersing the guests were photographed by the light from the vacuum tubes.

A PITTSBURGH oil company is about to introduce electricity as power for the operation of drills, pump, etc., at their wells in Washington County, Pa. By the proposed method only five men will be required instead of the large number hitherto employed. This company will be the first to experiment with electric power for drilling. It has figured that in the saving of running expenses it can pay for the electric plant in eighteen months. The only trouble experienced in this connection is in supplanting steam used to heat the oil so that it will be accepted by the pipe lines when under grade. The company thinks it has figured out this problem successfully by using a coil of high resistance in its tanks. It is claimed that this coil will furnish sufficient heat to separate the oil and bring up the grade, so that the pipe lines will accept it.



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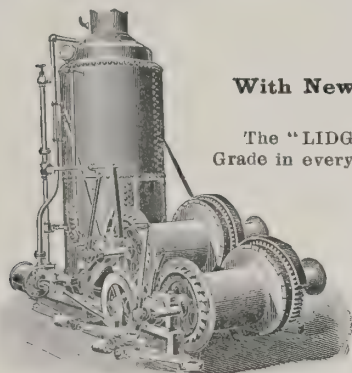
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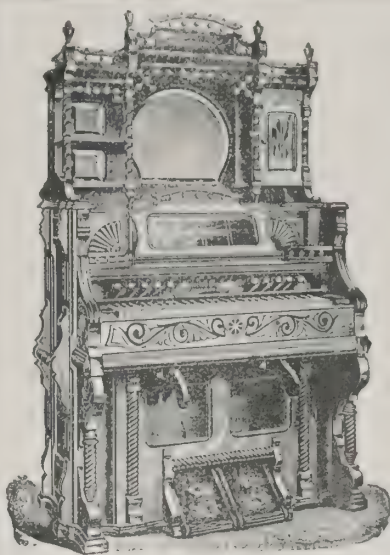


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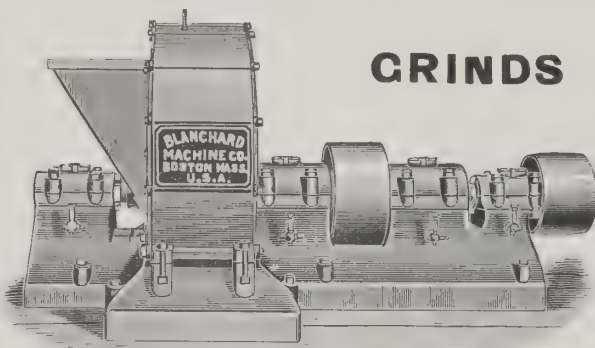
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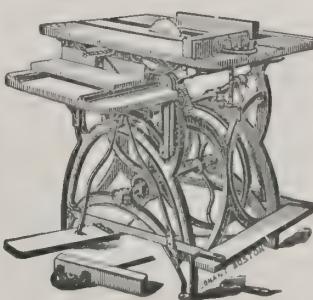
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TRIBUNE MODEL 27.

Price \$100. Weight 23½ lbs.

This is our standard men's wheel and is suitable for all kinds of road use. It is built in three heights of frames, 22½, 24 or 26½. The wheels are 28 inches diameter; 26 inches will be furnished if preferred. Gear, 68; options, 60, 63, 72, 73 or 80; cranks, 6½ inches, 7 inches if preferred. If not otherwise specified, all machines will be fitted with Hartford or Morgan & Wright tires. All wheels are supplied with tool bag, tools and repair kit. Regular finish, black enamel, nickel trimmings. If a lighter wheel than the above is desired, order should specify Model 21, which will weigh with light road equipment about 20½ lbs.

## Tribune Bicycles.



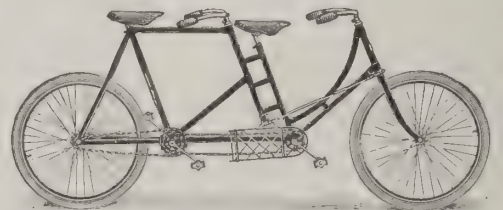
TRIBUNE MODEL 24. Price \$100.

Our ladies' wheels are built in three heights of frames, 20½, 22½ or 24 inches. 20½ inches is standard and will be shipped if not otherwise specified. Wheels, 28 inches, can be furnished, with 26 if preferred. Regular gear, 63; options, 56, 60, 68 or 72; cranks, 6 inches throw. The weight is about 24 lbs.

The Celebrated  
Cycloidal  
Sprocket.



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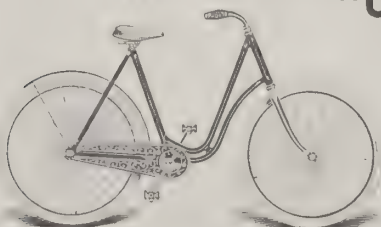


TRIBUNE MODEL 23.

Price \$150. Weight 44 lbs.

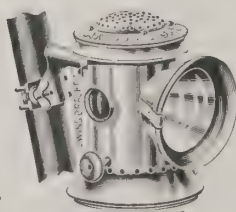
Our tandems are also built with double diamond frame for use of men riders. Wheels are 28 inches; height of frame, 24 inches; ladies' forward frame, 20½ inches. Gear, 68; can fit with 72, 76 or 80, if desired.

## For the Leading American Wheel Order the "GREAT EASTERN."



It is up to date,  
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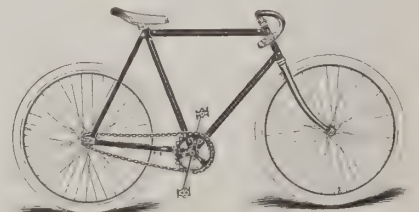
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### Chicago Sells Wheels to the World.

CHICAGO'S market is the world. Wherever civilized people ride wheels, there Chicago sells them. All Europe is a customer. Australia and New Zealand are first-rate markets. Japan in the last two years is considerable of a factor, and India now is buying "bikes" here. There was hard work in getting a foothold in Mexico, but the southern republic is now a good customer. Bicycle business is booming in the South African gold fields, and Chicago has an active trade in the Transvaal and Cape Town. An order was received this week for seventy wheels to be shipped to Johannesburg. Canada is not much of a direct market, for the reason that enterprising Americans put plants into the Dominion which come very near supplying the demand; hence importations are small. Much of the profit in the Canadian industries comes back across the border.

In France, and particularly in Paris, with its perfect streets, Chicago wheels meet with great favor. Their beauty, lightness, easy running qualities and artistic finish appeal strongly to the French. Recently Parisian manufacturers have taken to importing American machinery and turn out machines closely resembling the original Chicago article. England also imports a large number of Chicago-made bicycles.

### Duties on Cycles.

THE duties on cycles exported to the various countries of Europe is as follows: France, \$48.25 on every 222 pounds (about 25 cents per pound dead weight); Germany, \$5 on every 222 pounds, being nearly 3 cents per pound; Austria, \$12.06 each; Belgium, 12 per cent. ad valorem; Denmark, 10 per cent. ad valorem; Greece, \$2 each; Italy, \$8 each; Luxembourg, 3 cents a pound; Netherlands, 5 per cent. ad valorem; Portugal, 27 per cent. ad valorem; Roumania, \$1.55 each; Russia, \$7.80 each; Spain about 6 cents per pound; Sweden, 15 per cent. ad valorem; Switzerland, about 6 cents a pound; Turkey, 8 per cent. ad valorem; Egypt has a duty of 8 per cent. ad valorem. Great Britain has no duty on cycles.

### Cycling on the Rand.

THE cycling craze has captured South Africa. About two years ago a few women wheeling through the streets of Cape Town shocked a community which is very tenacious of its traditions. These adventurous females made no impression upon their fellows. On the other hand, the "Rand Women Cyclists" are enthusiasts, and their influence is spreading from Johannesburg to Pretoria, Klerksdorp, Heidelberg and other of the Boer towns. The way was opened in Johannesburg by the laying down of a track at The Wanderers, as the chief bicycle club is called. The advanced women cyclists are now allowed to use it.

THE shipments of a lower Broadway (New York) export firm to Hamburg reached in one week recently a value of upwards of \$200,000. The firm in question make a specialty of shipping manufactured goods only. The quantities of some of the goods which have been shipped constitute a total of 490 bicycles, 510 cases of refrigerators, two small plants of laundry machinery complete, 6,000 boxes of stove polish, 90 cases of saddles, 1,200 cases of sewing machines and many other articles in the manufactured line.

—The bicycle industry, as might be expected, has proven a powerful stimulus to the inventive faculty of the native American. This faculty has the happy knack of keeping in touch with every new and popularized device that makes its circle of human fads or needs. It has been faithful to the cycle, as is shown by the fact that since 1876 over 4,000 cycle patents have been issued in the United States.

—A bicycle manufacturer in Birmingham, England, recently ordered a million feet of tubing of an American manufacturer.

### A New Saddle.

THE experienced cyclist who distributed his weight between the pedals, the handle bars and the saddle is not looking for a soft and springy seat. He generally chooses a plain saddle with the leather tightly stretched. The shocks of car rails and cobblestones are lessened by rising in the pedals. It is the rider who sits on a saddle as he would on a chair who is bounced up and down on rough roads. A large number of cyclists, however, want a yielding saddle. This is proved by the extensive manufacture of padded saddles and saddles supported on springs. The latest product in this line as shown consists of four strong steel wires carried back from the clamp to the centre of the saddle, where they diverge, two being brought in a circle to the front from each side. The leather pads are supported on these wires and each pad at the front is free to adapt itself to the movements of the rider, the effect being to absorb the vibration of the bicycle. The rider's weight is thrown wholly upon the divided pads at the front. The rear part of the seat is for preventing any tendency to slide backward. When riding erect the back scarcely touches the rear, and the cyclist who bends forward is independent of the rear support. This saddle was designed by a physician.

### Aluminum-Coated Steel.

ONE of the latest novelties in the field of sheet-metal working as noticed in the *Metal Worker*, and produced by a firm in St. Louis, Mo., is that of steel sheets coated with aluminum. These, it is claimed, being superior to and more durable than galvanized iron, tin plate or planished iron for many purposes for which those materials are now generally used. The special advantages of such aluminum-coated sheets are stated to be that they can be worked and seamed without peeling the coating, adhering absolutely to the sheet, can be easily soldered, will resist the action of sulphurous gases, and can be heated to a red heat without destroying the coating. Moreover, such sheets can, when desired, be polished to a lustre equal to burnished silver or nickel. An absolutely smooth and evenly covered surface is presented, free from imperfections of any kind. Aluminum-coated sheets plated with copper are also produced, and these also take a high polish.

THE National Association of Manufacturers of the United States is now taking steps for the establishment of the first of a series of sample warehouses which it is proposed to locate in many foreign countries where American trade is capable of large developments. The first of these warehouses is to be in Caracas, Venezuela. The building is an imposing edifice constructed in the usual South American style and occupying one of the most prominent sites in the city. The purpose of the warehouse is to show American goods to the people of Venezuela and to enable them to become thoroughly familiar with articles made in this country. It will also serve as a bureau of information both for Venezuelan buyers and for the members of the association. The Government of Venezuela has manifested its friendly disposition by granting to the association the privilege of entering samples for exhibition free of duty until sold.

AN improved lamp-burner intended to obviate the possibility of the wick dropping into the oil, through the thumb-piece being turned the wrong way, has been patented by F. P. Boland, of Providence, R. I. Besides having an automatic extinguisher, a spring plate reaches down to the star wheel and meshes with its points or cogs in such a manner that while the wheel may be turned in the direction to raise the wick, it is prevented from being turned in the opposite direction by impingement of the spring against the wick tube.

—A direct steamship line between Charleston, S. C., and Liverpool is about to be established under the name of the Charleston Transport Line. The enterprise has the backing of the railway companies whose lines run from the great grain centres of the Southwest to Charleston, so that it is expected that that port will become an important shipping point for grain and general merchandise, in addition to cotton which has been the principal export staple hitherto.



## Building Extraordinary.

SOME remarkable freaks are found among the inventions in building materials recorded at the Patent Office. One genius proposes to make bricks out of pressed paper pulp, which is declared to be admirably adapted for the purpose, being very durable, non-absorbent of water and a non-conductor of heat. Glass bricks are the invention of a Swede named Gustave Falconnier. They are hollow, being blown in any desired shape, and colored to suit the taste. They may be made very ornamental, and may even be engraved with designs by means of the sand blast. Cost need not prevent anybody from indulging in the luxury of a glass house, inasmuch as these bricks are quite cheap. Being hollow and airtight they serve as non-conductors of heat by confining air that is in a state of rest. For obvious reasons they are not transparent.

It is said that the glass bricks do not transmit sound very readily. This is a point that seems to be considered as of much importance in architecture, and quite a number of patents relate to what is termed the "deafening" of buildings, *i. e.*, making them soundproof. One inventor proposes to fill the walls with seaweed and salt water plants compressed between sheets of paper and nailed in place. For this purpose he prefers eel grass and flat-leaved algæ. These, he asserts, are not at all inflammable, even when dry, because they contain a large percentage of silica. If partition walls are prepared in the manner described, sound will not carry from room to room. The same process applied to floors will prevent the occupants of a non-musical flat from being driven insane by the tintinnabulations of piano-playing neighbors.

Equally ingenious is the idea of another patentee who proposes to construct floors with rows of tin cans laid between the beams and beneath the planking. The cans are exhausted of air, each of them containing a couple of quarts of vacuum, so to speak. It is explained that, while making the floor lighter, they will prevent the transmission of sound or heat. Not one of the idea makers is more original, however, than an Iowa gentleman who suggests the employment of hay in the building of houses. He would have the hay compressed into large brick and used like ordinary bricks in the construction of the walls, fastening them together with wire in lieu of mortar. Perhaps equally striking is the notion of a genius who has devised a process for making artificial lumber. He takes a lot of cornstalks and pours upon them a mixture of liquid cement, wool, hair, feathers, vitriol and soluble glue. When it hardens, there you are.

If you like, though at the risk of infringement, you may adopt the idea of a Connecticut man who has thought of a way of making doors fireproof by placing a sheet of asbestos between two layers of board. More interesting, however, is a patent newly granted to a person named Pickring, of Richmond, Canada. He suggests that chimneys and smokestacks might be made of wood much more economically than of bricks. Coating the inside of the chimney with paint and throwing sand upon the latter while wet, he obtains a surface absolutely proof against fire, and heat transforming the mixture of sand and paint into a homogeneous glassy glaze. This invention is a great boon, inasmuch as brick chimneys are sadly expensive. Incidental to the discussion of freak patents in the building line, it is worth while to mention a Buffalo inventor who has devised a ratproof and bugproof house. Of course rats make their homes in the walls of dwellings commonly, finding free passage everywhere; but the style of house referred to has walls divided into compartments by partitions that are sealed with cement, so that "varmints" of all sorts are prevented from getting about.

Portable houses are among the luxuries of these days, and in this line there are a good many patents. If you want to carry a comfortable dwelling with you when you are going to the Adirondacks you can get one that will fold up like an umbrella; it is made of wood and wire net. For a Summer home at the seaside you can procure a ready-made house in sections, all ready to be put together. Really handsome cottages can be purchased in this way, and the railroad will deliver the structure complete, in pieces, on the lot where it is to be put up. Within a few hours you can move in and begin housekeeping, realizing in actual fact the story of Aladdin and his famous palace that grew in one night.

During the last few years tornadoes have been doing more damage than ever before, owing to the thickening settlement of the regions infested by those meteorological destroyers. Consequently it is not surprising to find that patents on methods of escape from such storms have multiplied. A Chicago man named Zimmerman has obtained exclusive rights in a "cyclone roof" house which is fastened down by anchors that are buried deep in the ground. To these anchors are attached iron straps which pass over the roof and are guaranteed to retain their grip on the structure against the efforts of the most robust tornado. Another genius has patented what he calls a "cyclone refuge" which is a cylindrical iron tank buried under ground and provided with a chimney for air. Into this the frightened family can crawl and make sure of safety until the storm demon has gone by. Mention should not be neglected of the tornado-proof dwelling, which has a wooden sail and revolves on a pivot when struck by the whirling funnel cloud, nor yet of the earthquake-proof house set on ball bearings, which is warranted not to wobble seriously in the most tremendous seismic disturbance.—*St. Louis Globe Democrat.*

THE GENERAL ELECTRIC COMPANY has received by cable from E. W. Rice, an officer of the company, now in London, the announcement that he has secured the contract for the equipment of the Central Underground Railway in London. This is one of the new underground systems in that city, and it is understood that the first order for machinery will amount to \$500,000, and that it will be followed by other orders amounting to several hundred thousand dollars. All of the machinery will be made in this country.

## A Universal Newspaper.

THE telegraphic reproduction of stereotype plates for newspaper printing is reported to be among the latest achievements of electrical invention. It consists in the transferring and reproduction of exactly similar newspapers in widely separated cities by means of the electric current in season for practically simultaneous production.

A New York newspaper could thus appear in Boston, Chicago or New Orleans without being sent through the mails. The inventors claim for their apparatus not only increased rapidity, but they say also that it will reduce the cost of printing. The inventors and patentees, C. Meray-Horvath and C. Roar at Graz, describe the working of the apparatus as follows:

"The copy is first of all run off on a typewriter, which serves as corrector's proof. A special attachment released a narrow strip of silvered paper, which is covered by a number of short strokes and dots, constituting an alphabet peculiar to this machine. These strokes and dots are made by means of a chemical fluid, which so changes the metallic surface of the paper that it becomes nonconductive.

"Any corrections becoming necessary can be made on the strip of silver paper; inserting or cutting out of copy is also easily performed. After being edited and corrected, the long strip of silver paper is rolled up on a spool and inserted into a telegraphic apparatus, which, when set in motion, will reproduce the same strokes and dots on a similar silver paper at any distance, and in any number of apparatus connected at the same time.

"These strips of silvered paper are placed into the 'electric typograph' The strip passes beneath six points of electric contact covering the entire width of the metallic surface. The typograph operates in such a way that the steel type representing each character is imposed upon a prepared cardboard in the proper order. An automatic mechanism provides for the varying width of the type, for the spacing and alignment, and for the moving of the cardboard at the end of the line.

"The cardboard, fully covered with characters, represents one solid column of copy. As compared with the type-setting machines now in use, this apparatus gives the advantage of correcting and editing the entire copy from typewritten proofsheets. The inventors claim for the typograph that it will do the work of eight expert typesetters and save two thirds of the cost of setting up the copy by hand."—*Fourth Estate.*

AS the fiscal year 1897 will end on June 30th, it is now possible to approximate to the value of our exports, both of manufactured goods and of agricultural products, during the twelve months. And the following table will show that it has been the banner year in both classes of exports:

Year.	Exports of Manufactures—		Total Exports.
	Value.	P. C. of Total.	
1860.....	\$40,345,893	12.76	\$3 6,242,423
1870.....	68,277,764	15.00	455,208,341
1880.....	102,856,015	12.48	823,946,353
1885.....	147,187,527	20.25	726,682,946
1890.....	151,102,376	17.87	845,293,828
1891.....	168,927,315	19.37	872,270,283
1892.....	158,510,937	15.61	1,015,732,011
1893.....	158,023,118	19.02	831,030,785
1894.....	183,728,808	21.14	869,204,937
1895.....	183,595,743	23.14	793,392,599
1896.....	228,489,873	26.47	882,519,229
1897.....	272,000,000	25.01	1,079,000,000

AMERICAN competition in the iron and steel trades has begun seriously to affect another of our local industries. For some time past the Scotch makers of iron and steel tubes have been feeling the pressure of American competition, as several of the largest tube firms in the United States have opened agencies on this side and are bidding for orders. Several have recently been placed for oil-pipe lines (in connection with the discoveries of oil wells in Sumatra and Borneo) in the United States at prices which the British makers could not look at. The American firms are shipping boiler tubes here and they are disturbing the position very much. The important point for the British maker is whether this is merely a temporary competition or one that is likely to last; but one thing is certain, that the American prices are below the present cost of production in the United Kingdom.—*London Engineering.*

A NEW fire appliance is a nozzle, of ordinary shape, so constructed that the top of its barrel can be screwed off, and in the water chamber a chemicalized soluble cartridge or candle can be placed. Underneath this is a rubber ball, which forces the cartridge forward when the pressure is turned on. The action of the cartridge on the water is to cause it to dissolve slowly and mix with the water, which is thrown through a small aperture in the same way as in the ordinary chemical nozzle. The cartridge will last as long in discharging as twenty-five gallon extinguishers, and it can be renewed with only a few seconds delay. This appliance gives a practically continuous stream of chemicalized water as long as it is required. The fire-extinguishing quality of the water is acquired from its absorption of carbolic acid gas within the cartridge.

—Walter Kennedy, of Pittsburg, has taken charge of the Chinese iron works at Han Yang and is making good steel rails, 30 feet in length, at the rate of 120 per day. United States Consul Child, who reports the fact to the State Department, says the Chinese officials are well pleased at the skill Kennedy has shown in getting their plant in order. The rails are shipped to Shanghai to be used on the Wosung Railroad.



# THE NORTHAMPTON Strictly High-Grade BICYCLE.

MADE BY SKILLED MECHANICS.

Constructed  
from the  
Best Material  
Obtainable.

Liberal  
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Two Models,  
Ladies' and  
Gents'.

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THE NORTHAMPTON CYCLE COMPANY,  
NORTHAMPTON, MASS., U. S. A.

Our English Catalogue will explain to you how and why we claim that

'97 *Cutting* \$100  
BICYCLES.

are the most serviceable line of wheels ever placed upon the market. We don't seek to hypnotize buyers into taking anything what they don't want.

You tell us what you want and you get it.  
That's business, is it not?

Every fitting is of the highest known grade. You may have any high-class tire, saddle, rims, pedals or anything else that goes with a good wheel, that you specify.  
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HAY & WILLITS MFG. CO.

76 N. Pennsylvania St.,

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Patee bicycles have a world-wide reputation because they are always "up to date" in every particular, and also because only the very best material is used in their construction.



They are built by the oldest and best-known high-grade bicycle men in America, and the '97 model embodies some new and special features that will fascinate wheelmen and dealers instantly.

The one-piece crank shaft and crank, the thorough dust-proof device, the quality of tool-steel in bearings, the manner of re-enforcing, the adjustable bar and manner of locking in the head are all new and special features used exclusively on the "Patee" (our own patent).

Do not contract for '97 without getting our catalogue and prices and seeing sample. It is unblushingly and emphatically the best bicycle in the world for the money, and is guaranteed equal to any bicycle in the world. American list, \$60.00. Liberal discount to dealers. Do not be afraid to write. We want your business and will take pleasure in telling you more about our wheel. Address

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THE  
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Men's No. 7, 24 lbs., \$100.

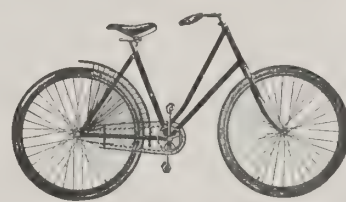
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ALWAYS MAIL COPY OF ORDER DIRECT TO US.

DIRECT ORDER MUST BE ACCOMPANIED BY CASH.



Women's No. 6, 25 lbs., \$100.

Export Discount, 55 per cent.

**FRAMES**—22, 24, 26 inches high; seamless steel tubing, large diameter; reinforced joints, 43 inch wheel base.

**WHEELS**—28 inches, wood or steel rims; piano-wire swaged tangent spokes nicked, barrel hubs turned from bar steel; M. & W. tires.

**BEARINGS**—Dust-proof; large balls; special steel cones, oil tempered; steel-ball races, tempered and polished.

**HANDLE BARS**—Drop, high, Ramshorn, steel or wood; cork grips.

**GEAR**—64, 68, 72, 76, 80; forged sprockets, hardened; Cranks, 6½ inch, forged; Chain, ¼ inch, hardened.

**FINISH**—Black or colored enamel, highly polished; nickeling done on copper

**EQUIPMENT**—Saddle, pedals, tool bag, tools and tire-repair outfit.

An extra set of Bearing Cones furnished with each Wheel for Export.



ENVOY.

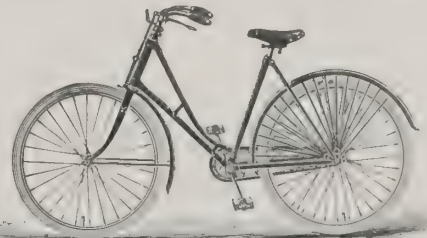
None but expert mechanics employed in their construction.

Absolutely high grade in every detail.

Best wheels ever offered at anything like the price.

Write for catalogue and full information as to terms, etc.

BUFFALO CYCLE CO., Buffalo, N. Y., U. S. A.



FLEETWING.



Our Watches and Clocks are known throughout the world as of the highest quality, and our Cycles are of the same grade.

HOWARD BICYCLES - { Singles, \$100.  
{ Tandems, 150.

Agents for Great Britain:  
UNION BOOT & SHOE MACHINE CO.,  
LEICESTER, ENG.

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Clocks,  
Tower Clocks.



### Nautical Wonder.

THERE is now being constructed in New York what is claimed will be the fastest boat that ever was conceived. It is a diminutive craft, for it will be only 67 feet long, 6½ feet beam, with a draught of 5½ feet. The total distance from the keel to the deck will be 12 feet. The pilot house will rise four feet higher.

The inventor of this marine wonder is F. J. L. Lowe. She will be commanded by Capt. C. J. F. Fluidt. Mr. Lowe claims that the boat will make 40 miles an hour, although this is doubted by experts. The truth of the matter will be known, however, the middle of next month, for then the test of speed will be made. As the accompanying illustration indicates, the little craft is oddly shaped. The dwellers about the Great Lakes who are familiar with the whaleback type of boat will at once notice the resemblance. She is very like, so far as her hull is concerned, the Christopher Columbus, the giant whaleback steamer which, during the Columbian Exposition, carried thousands of persons to and fro between Jackson Park and the foot of Van Buren street in Chicago.

Her propeller looks not unlike a clamshell, the two halves of which are pivoted together at one end, a semi-circular slice being taken out of one shell, close to the pivot. The two halves of the shell are placed almost end for end. These apparent clam shells are really two steel plates, and experiment has shown that they cut the water with the least resistance offered by any propeller ever made. The care which has been taken in the selection of the very best idea is shown by the rejection of nineteen propellers before Mr. Lowe accepted this one. The width of the propeller is 3 feet. It strikes the water at the base and then at the top, its locomotion being much after the fashion of the swimming of a dolphin. In fact, the whole boat is the reverse of the ordinary methods, as it goes through rather than over the seas.

Sixty-seven feet from stem to keelson does not give much room, certainly not enough to swing the traditional cat. Yet the saloon of this little craft is 13 feet long and 4½ feet wide. There are three staterooms, quite roomy affairs, too, as staterooms go, very comfortably fitted up, according to the plans. There are bunks beside these, in which the members of the crew of five will sleep if they wish. At a pinch, the boat can accommodate 30 persons. Her kitchen is a tiny affair, very like the old-fashioned cook's galley that is perched on the main deck of a vessel. The engine-room is also on the lilliputian order, for the motor does not require a deal of room.

The motive power of the vessel is derived from gasoline. This is another instance where the ordinary methods are reversed. Many people suppose that gasoline is an exceedingly dangerous explosive, and that to explode it is one of the easiest things in the world. The experts who have been working with Mr. Lowe find that a boat propelled by power emanating from gasoline is not as likely to be the victim of accident as if electricity was utilized. It is held that the danger resulting from a possible explosion in gasoline is confined to a certain portion of the vessel, right near the engine, whereas if electricity was the source of power, the whole vessel might be disabled in a manner the cause of which it would be difficult to ascertain.

Mr. Lowe has been studying this problem of speed for a good many years. In fact he made nineteen models of the invention before he found one which he considered acceptable. He holds there is no mystery about the craft whatever, but that it simply represents the practical application of a scientific principle. The whaleback represents one type; the submarine craft another; the most modern steamships another. Mr. Lowe has had the benefit of all the ideas grouped in these three classes. After long study he became of the opinion that the inventor of the whaleback had come nearer to the real principle sought in navigation than any one else. The great drawback to a high rate of speed by vessels has been the resistance offered to the water. Instead of utilizing the movement of the ocean or of lakes and rivers, as a means of accelerating speed, shipbuilders have been forced to consider how much they could lessen the resistance caused to a vessel.

In this case the whaleback type has been adopted. And yet there is a decided difference. The bow of Mr. Lowe's vessel is a trifle sharper than that of a whaleback. There is more of a slope, upper and lower, to a centrifugal point, than in the whaleback. The craft is so constructed that the seas will not make her turn turtle, should she get in the trough thereof. Her peculiar shape is such that great waves would slide over her instead of breaking against her. She would not feel at any time that sudden stoppage and check that the ordinary vessel encounters when she meets head seas. The chances are, the experts say, that Mr. Lowe's craft, so far without a name, is going to be a world beater and break all records.

There have been no startling announcements concerning this new craft, because her projectors say they prefer that she shall tell her own story, and that they will begin to talk when she begins to break records. No effort at secrecy is being made by her constructors, and any one who wishes can walk in and see her, providing he can command the courtesy which offers the only avenue by which visitors can enter an institution of this kind. She will make her maiden effort some time this month, provided no accidents occur. Then, with the Stars and Stripes flying at her peak, the little craft will endeavor to show all creation a clean pair of heels.

—A partner of a leading wood-working machinery manufacturing concern wrote recently from London to his local agents, saying that in a contract for a plant, which was to be furnished through a London firm for some part of South America, upward of \$25,000 of the machinery called for in the specifications is to be of American manufacture. The order will probably reach the respective makers some time in the early part of June.

### A Gigantic Umbrella.

THE last Paris Exposition had its Eiffel tower, Chicago had its Ferris wheel, Nashville has its giant seesaw. The Department of Concessions of the Omaha Transmississippi Exposition of 1898 has also received an application for space for the erection of a novel mechanical device. It resembles the framework of a gigantic umbrella more than anything else which might be mentioned. The part corresponding to the stick of the umbrella is an immense cylinder, 30 feet in diameter, constructed of steel plates, firmly riveted, making a "standpipe" which rears its head 250 feet above the level of the ground. At the extreme top of this cylinder are fastened twelve long arms resembling the ribs of an umbrella. These are steel trusses, reaching almost to the ground. At the lower end of each of these ribs is suspended a car for carrying passengers, each car having a capacity for twenty persons.

These monster ribs are raised by hydraulic power acting by means of steel cables operating through the cylinder, aided by a mechanism greatly resembling that portion of an umbrella which comes into action when the umbrella is opened. By means of this mechanism the gigantic arms are raised until they are horizontal, the cars in the meantime being carried outward and upward until they reach a point of 250 feet above the ground, the diameter of the huge circle formed by the suspended cars being also 250 feet. When the highest point has been reached another mechanism comes into play and the suspended cars are swung slowly around in a circle, after which they are lowered to the ground. The sides of the cars are of glass so that the passengers may secure an extensive view of the surrounding country.

### Our Exports of Manufactures.

ANOTHER remarkable record of increase in manufacturing exports is afforded by the figures for April, as computed by Chief Ford of the Bureau of Statistics of the Treasury. They amounted to \$24,014,318, or 31.56 per cent. of the total exports of the month. The figures for the ten months of the fiscal year ending with April were increased to \$224,023,016, which is 25.35 per cent. of the total exports for this period. The total for the month has been surpassed only once in the recent commercial history of the United States. This was during the month of March preceding, when a great movement of imports naturally invited a counter movement of exports. The manufacturing exports of April, 1895, were only \$16,304,411, so that the figures of this year show an increase of nearly 50 per cent. The proportion of manufacturing to total exports at that time was 25.49 per cent. The figures for 1896 were \$21,384,730, which was 30.81 per cent. of the total exports. The figures for the ten months ending with April show results in some respects even more striking. The manufacturing exports during that period in 1895 were \$148,710,195, or 21.97 per cent. of total exports, and in 1896 were \$184,572,665, or 25.16 per cent. of total exports. The remarkable record of the past three years shows an almost constant ascent month by month in the volume of manufacturing exports. The figures for the three calendar years have been as follows:

Month—	1895.	1896.	1897.
January.....	\$14,101,733	\$18,732,547	\$10,622,850
February.....	12,221,897	17,265,164	20,298,097
March.....	15,576,783	19,125,795	25,874,469
April.....	16,304,401	21,384,730	24,014,318
May.....	18,144,676	22,016,999	.....
June.....	16,840,752	21,898,972	.....
July.....	17,306,192	21,553,500	.....
August.....	19,050,590	21,147,206	.....
September.....	16,352,356	21,684,784	.....
October.....	18,778,817	23,479,279	.....
November.....	17,330,143	21,639,358	.....
December.....	19,251,271	23,773,281	.....
Total.....	\$201,153,663	\$253,688,527	.....

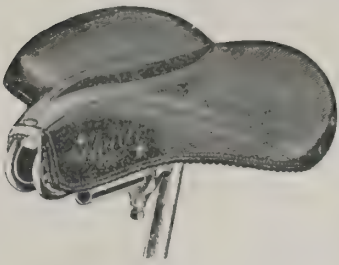
### Novel Reservoir.

A RECENTLY constructed reservoir in Pawtucket, R. I., exhibits some novel resorts of a practical nature in engineering worthy of note. The plan of this reservoir, to meet the hilly area, is circular, with an inside bottom diameter of 95 feet, a top diameter of 97 feet and a depth of 12 feet. The concrete used in the construction of the bottom and walls was composed of one part Portland cement, three parts sand and six parts gravel, and the bottom was of concrete 9 inches thick over the whole area, excepting at the walls, where it was increased to 1 foot 9 inches thick; there was no joint or line of junction between the bottom and the walls, both being laid simultaneously as one mass. The concrete of the reservoir walls is 4 feet thick at the bottom and 2 feet at the top, the height being 12 feet, with an inside and outside batter of an inch to the foot imbedded in the concrete walls and extending around them are four rings of wrought iron of ¾ to ⅝ inch diameter, the first of these being 1 foot down from the top of the wall and a foot from the back, the others 1 foot apart below this. Outside the concrete walls and extending around them is an earthen embankment sloped from the top of the wall; inside, the concrete bottom was covered with cement plaster, and finally the walls and bottom layered with hot Trinidad asphalt.

—A New York export firm lately placed orders with a Cincinnati concern for machinery valued at upward of \$16,000. The class of machinery bought was iron-working tools. The goods were shipped to Liverpool, their ultimate destination, however, being Southern Europe.



## The Wheeler Reform Saddle



BUILT TO SIT ON,  
NOT TO STRADDLE.

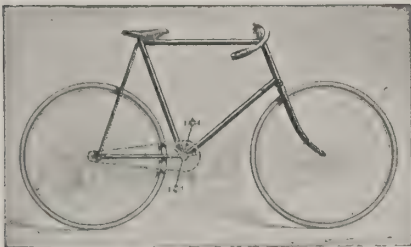
never gets out of shape, fits the rider and keeps one free from saddle soreness.

Dealers never have them come back on their hands. Riders prefer them to all others. Endorsed by physicians and especially recommended for ladies. If your dealer cannot supply you, write

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195 Larned St., Detroit, Mich.  
Catalogue free.  
In ordering through export commission houses, send us duplicate order.

## SUPERB — OWEN BICYCLES — SUPERB



**SUPERIOR** { Design.  
Workmanship.  
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**WE NEVER COPY;  
WE ORIGINATE.**

Easiest running and most perfect bearings in the world.

**THE OWEN OUT-COASTS THEM ALL.**

Write for Catalogue and Terms.

**OWEN MFG. CO., New London, Conn., U. S. A.**

## RED CROSS RUBBER CEMENT.



The BEST CEMENT in the world for Repairing Pneumatic Tires. For sale by all first-class dealers throughout the world. It has no equal. These tubes are put up in neat and attractive cases, containing one dozen tubes each. None genuine unless it bears our trademark—

**RED CROSS.**

Send for catalogue of Red Cross Specialties. Sample Tube by mail, 25 cents. Ask your dealer for it and take no other. Manufactured by

**ARLINGTON U. BETTS & CO., Toledo, O., U. S. A.**

## NIAGARA BICYCLES.

AGENTS WANTED.



GOODS GUARANTEED.

Correspondence Invited.

Catalogues on Application.

## BUFFALO WHEEL CO.

BUFFALO, N. Y., U. S. A.

*Temple*

SEND FOR CATALOGUE WITH  
PRICES AND TERMS.

**12 MODELS. ALL STYLES.**

LIBERAL DISCOUNTS,  
PROMPT SHIPMENTS,  
TWO YEAR GUARANTEE.

HIGHEST GRADE WHEELS AT  
LOWEST PRICES.



## Importers

SHOULD BUY NOTHING BUT  
THE BEST.

Our Bicycles are carefully boxed for shipment. We have a New York agent to attend to securing low rates on ocean shipments and marine insurance. Our prices are not the lowest because our wheels "are not" the cheapest. "IT WILL PAY YOU TO BUY THE BEST." Satisfaction guaranteed.

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## Secure Agency for Soudan, Nile and Pyramid Bicycles.

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Saddles Are Famous  
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FOR THEIR SUPERIOR QUALITY, DURABILITY AND COMFORT.

European Agents: MARKT & CO., Ltd., Hamburg, London, Paris and New York.

Send for catalogue showing many different patterns.

**HUNT MFG. CO.,**

**WESTBORO, MASS.  
U. S. A.**



The felt pads are supported on a laced framework of tough but elastic leather thongs.

**GOOD AGENTS WANTED**

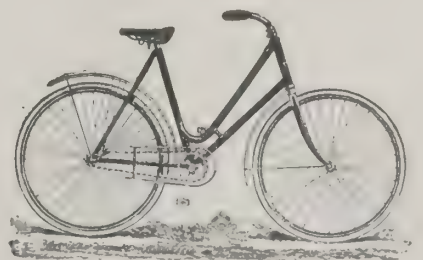
TO REPRESENT

**The Standard Wheel**

**OF AMERICA.**

Write for Terms.

Write for Catalogue.



**STANDARD BICYCLE MFG. CO., 71 Jackson Blvd., Chicago, Ill., U. S. A.**



## Miscellaneous Notes.

—More than \$22,000 worth of American soda-water apparatus was shipped to England recently.

—The M. S. Benedict Manufacturing Company, Syracuse, N. Y., has received an order from Sydney, Australia, for 3,800 pieces of silverware.

—A cargo of fir lumber containing 200,000 feet has recently left Tacoma for Yokohama, Japan. It is sawed  $\frac{1}{2}$  inch thick, and it is said will be converted into tea chests.

—Chicago is to have another exhibition. This time it is to be for the products of the State of Illinois only, and will be under the immediate auspices of the merchants of Chicago.

—John R. Bukalt, of Stevens Point, Wis., has invented a self-rocking cradle. It is operated by clockwork actuated by a spring which is wound by a crank extending out conveniently from one end of the frame.

—A Boston firm has recently received an order from Paris for 250 gross of their shoe polish. When it is figured that it requires 36,000 bottles of the polish to fill this order it will be seen that the amount is a large one.

—A contract has just been closed between an Amsterdam and a Pittsburg, Pa., company, whereby the latter firm agrees to supply the former with ninety miles of pipe line for the Dutch company's oil field in Sumatra.

—The official trial of the U. S. gunboat Nashville makes her the fastest vessel of her class. The average speed was 16.7 knots, and as the required speed was but 13.07 knots, a bonus of \$60,000 was earned for her builder.

—A large order for platform scales has been given to a Cincinnati company by a concern in the City of Mexico, and the filling of the order by the local concern will mean the introduction of Cincinnati made scales into the Mexican market.

—A Paterson, N. J., firm has just closed a contract with the Chinese Government whereby it agrees to build eight heavy freight locomotives for that country. It has also secured contracts to build five locomotives for a South American railroad.

—Within six weeks upwards of 100,000,000 rice-paper cigarettes have been exported, principally to India, China and Japan. In Europe, it is stated, quite a quantity of these cigarettes also find a market, three White Star steamers having taken about 23,000,000 between them.

—The Russian Government has closed a contract with a Pittsburg, Pa., factory for two locomotives for a new railroad in Finland. They will be the first passenger engines used in Finland. It is said that upon the successful operation of these locomotives other orders will follow.

—The *National Provisioner* publishes details of the visit of some Danish gentlemen to this country for the purpose of buying meat wherewith to fill contracts for supplying the Danish army. The orders will hereafter be placed in Kansas City and Chicago and possibly at other centres.

—An exporter to Hamburg says that recently he has furnished quotations for laundry machinery valued at upwards of \$30,000. It is his opinion that other orders will follow on account of the many advantages which these particular kinds of American machinery have over those of foreign make.

—As an evidence of the attention inventors are giving to motorcycle transportation methods, it may be noted that the United States Patent Office has just granted patents on three widely differing modes of travel. These include a marine velocipede, a motor-driven sleigh and wings for aerial flight.

—A contract has been obtained from the city of Glasgow by which several of the streets are to be paved with asphalt taken from this country. The contractors say that quite a quantity of asphalt will be taken, and that the possibilities of creating a market for this material in Scotland are encouraging.

—An incentive to economy is suggested in the pocket savings bank invented and patented by Clarence L. Dawson, of Tacoma, Wash. It has the form and appearance of a watch. It is provided with a slot in the edge of the case for the introduction of the coin, to which access may be had, after the bank is filled, by a key.

—It is reported that Teheran, Persia, is to have a telephone exchange, and a New York house is to supply the instruments. They will have to be carried 800 miles on the back of mules to get to their destination after landing at Bushire. We think there is an opening here not only for a telephone exchange but for a trolley line.

—A Milwaukee concern has recently shipped two carloads of mining machinery to South Africa and several carloads of ice machinery to Sidney, New South Wales. The same firm has made and shipped to Africa a very large amount of machinery during the past year, and is still receiving orders from that part of the world.

—In accordance with instructions from the Japanese Agricultural and Commercial Department, Mr. Hisahiro Naito, president of the Japan Kerosene Oil Company, and Mr. Tokujiro Mishima, vice-president of the Zoo Kerosene Oil Company, sailed from Japan May 28th for Russia and America, to acquire information on the kerosene oil industry.

—A firm in Derby, Conn., has recently made a shipment of eight carloads of machinery to San Francisco, Cal., en route to Japan. The machinery, which consists of heavy calendars and frames for paper machines, was built on special order for an immense Japanese paper mill located at Oji, near Tokio, the local foundry having already shipped several carloads of machinery to the same concern.

## An Electric Fountain for Brooklyn, N. Y.

PARK COMMISSIONER DETTMER, of Brooklyn, N. Y., has placed a contract for the construction of an electric fountain in the plaza of Prospect Park. The contract price is \$24,500, and for this sum the company to which it has been awarded agrees to provide a fountain in complete working order and to operate it for one month to demonstrate its perfection before the final payment is made.

The contract provides that the contractor shall take the plaza as it exists to-day and erect a fountain which will have a capacity of throwing 100,000 gallons of water per hour, and that the current required will approximate less than 100 horse power. This amount of electricity is to be furnished free of cost to the city by the Brooklyn Heights and the Nassau companies, which have entered into an agreement with the park commissioner, each to supply one-half of the current required.

The circumference of the basin will be 370 feet and will be constructed of kosmocrete. Under the centre of this basin will be a pit in which will be placed a large portion of the machinery connected with the shifting of the colored plates of glass which are used to illuminate the rising columns of water. Leading from this pit to a place at the edge of the fountain basin will be a tunnel which will connect the pit with the operating room, where the person in charge of the fountain will stand, looking out of a window six inches above the water, thus enabling him to see the various combinations which his manipulation of the machinery will produce.

The electrical apparatus consists of nineteen automatic focusing arc lamps, connected in three series. Each lamp will be of 6,000 candle-power, mounted on an adjustable stand, which permits of its being raised from four to six feet from the floor of the pit and thus providing different angles at which the light may be thrown upon the ascending water. Three rheostats are to be furnished, one for each series of lamps, and each lamp is to be provided with large silver parabolic reflectors. The colored glass is to be operated by compressed air and controlled by electricity. There will be eighty incandescent lights ranged about the wall of the basin. The combinations possible by this arrangement of pipes and lights are innumerable. They will consist of fancy jets, umbrellas, ball sprays, straight sprays, wheat sheaves, rings, fans, funnels and combination jets. One curious display that can be given at the fountain is the throwing of a wide sheet of spray upon which pictures may be displayed. The first exhibition to be given at the fountain will be on July 4th, if the contractor completes his work within the required time.

CHICAGO is the greatest blanket market in the world. Tons and tons of them are sent out every day, regardless of the state of the weather. Whether the mercury is toying with the top or bottom of the thermometer is a matter of secondary importance to the blanket business of Chicago, as blankets by the carload go out of the city every business day of the year. Timbuctoo, Madagascar, Afghanistan and Alaska are not unacquainted with Chicago blankets, and anything that ever went into the construction of a blanket is represented in the material of which the Chicago blanket man's stock is composed.

—A good sized order for carriage material was placed recently by an exporter to Liverpool with a local manufacturers' agent. The shipment will constitute about two carloads. It is the opinion of the agent that the goods are for transshipment to South America, as the goods ordered are of the class largely used in the Spanish-American countries.

—There was a shipment of laundry machinery for Liverpool the end of last month which was valued at \$48,000. According to the exporter, there are a number of estimates at present throughout England and France for American laundry machinery. If only a portion of the orders which are expected should be received a satisfactory business will be done.

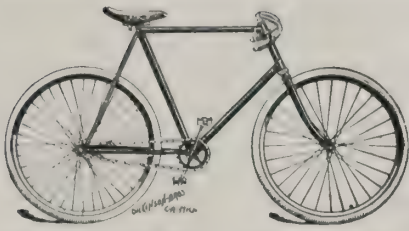
—Senator Pettigrew has introduced a bill in the United States Senate authorizing the Postmaster-General to acquire for the United States the invention of Prof. Crehore and Lieut. Squier for rapid telegraphing by alternating currents, and also to construct a line between Washington and New York for the purpose of experimenting with and perfecting the use of rapid telegraphy.

—Some good sales of sole leather to foreign houses have been made lately. One large concern shipped twenty-five tons of hemlock leather to England recently. Numerous cable offers for leather have been received in Boston, showing that the shoe and leather men across the water are keeping close watch of the American market and are fully posted in regard to the present low prices here.

—There is no cause to complain, according to New York export merchants about the present outlook of business from Sydney and Melbourne in some manufactured lines. Hardware orders have been coming in by every mail, and the quantities are fairly good-sized. Some contractors' supplies are also being bought in heavier lots than usual, including wheelbarrows, picks, sledges, etc. There has also been an active demand for printing paper. Several lots have been sent, the results of which have been satisfactory, and now, it is said, orders are arriving quite frequently.

—A patent has been applied for by a Connecticut company on a machine for the production of silk-lustre cotton yarns. This machine is entirely different from anything used abroad and the new yarns have given rise to a great deal of discussion, not only in this country but in Europe. The great advantage of the new process is that the lustre is of a lasting nature and is not affected by any process of dyeing or bleaching, by washing, by wear or by atmospheric influences. Moreover, the strength of the yarn is increased by the new process from 25 to 40 per cent.





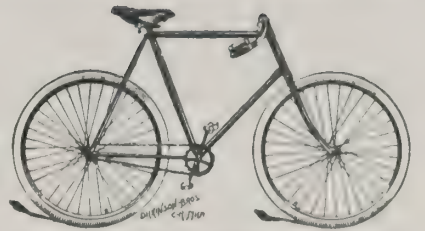
Halladay Roadster, \$100. Discount, 45 per cent.



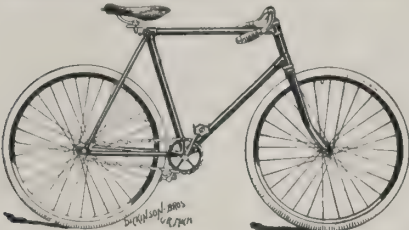
Lady Halladay, \$100. Discount, 45 per cent.



Lady Aetna, \$75. Discount, 50-5 per cent.



Aetna Roadster, \$75. Discount, 50-5 per cent.



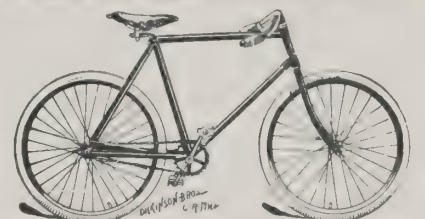
26-inch Boys' Aetna, \$50. Discount, 40 per cent.



24-inch Girls' Aetna, \$40. Discount, 35 per cent.



26-inch Girls' Aetna, \$50. Discount, 40 per cent.



24-inch Boys' Aetna, \$40. Discount, 35 per cent.

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**THE BUTTERFLY SEAT**

**BUTTERFLY BICYCLE SEAT CO.**  
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## The BUTTERFLY Bicycle Seat.

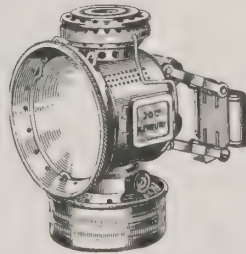
Conforms by means of adjusting bar to the exact contour of the anatomy of the body. It is practically two natural moulds upon which the human form can rest. These moulds are responsive to every motion of the limb. A boon to both sexes.

Price, \$4.00.

Catalogue mailed on application.

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## 20th Century Bicycle Headlight and Driving Lamp.

POPULAR ALL OVER THE WORLD.

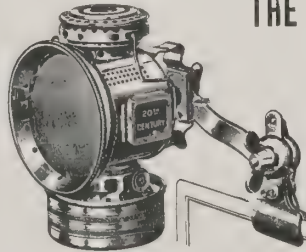
BICYCLE HEADLIGHT, with detachable Bicycle Holder, removed by simple pressure from the Lamp as well as from the wheel.

PRICES IN THE U. S.

Including one attachment, either Bicycle or Dashboard, gossamer hood, etc.

STANDARD.		TANDEM.	
Nickel	\$3.00	Nickel	\$4.00
Japanned (black)	3.00	Japanned (black)	4.00
Aluminum	3.75	Aluminum	5.00

## THE TANDEM SIZE AS A DRIVING LAMP,



with detachable carriage attachment, can be placed at any angle on dashboard or side irons of any vehicle. With the Bicycle and Carriage Holder detached and the ball handle raised the 20th Century makes a most excellent Hand Lantern for the house, barn, country road, camp, hunting and for boats. It may be used with colored front glass for developing photographs, etc. If not obtainable from dealers sent on receipt of price by



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The Best Wheels in the World!

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NO. 14 A.

For an easy and comfortable Saddle, this beats any Saddle on the market. Handsomely padded and covered with the finest leather in either black or russet.

Strictly Hygienic.

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## The "Daisy" Baby Carrier

for  
Bicycles.



List Price,  
\$3.00.

The bottom of this seat is made of light material; the sides and back are of rattan, beautifully woven and mounted on a double steel wire spring clamped rigidly to handle bar post, with a movable foot rest. The seat is covered with a nice cushion, making a very beautiful and easy riding seat for a child. See this seat and you will have no other.



### Novel Garbage Receptacle.

ONE of the nuisances complained of in the city of Newport is the handling of dry ashes on the street. The air is charged with dust blown from baskets and carts. Probably those who object to clumsy methods of removing ashes will be interested in a receptacle for refuse recently patented by Robert Frame, of Newport.

Waterproof and fireproof bags are filled on the premises. These are loaded on the cart and empty bags are left in the cellar or yard by the collector. The novelty of the invention is in the support for the bag. A sheet iron cylinder has in its bottom two hinged flaps which open outwardly and are closed when the cylinder is placed upon the floor and are prevented by studs from opening inwardly. The flexible bag has at its top means for attachment to the upper edge of the cylinder—for example, a series of eyes which can be slipped over studs located near the rim. If preferred, hooks may be attached to the bag, which can be slipped over the rim of the cylinder, or if the bag is made of fairly stiff material or is stiffened, as by the insertion of stiffening ribs, no means of attachment to the rim are necessary.

Near the mouth of the bag is a drawing-cord passing through eyes attached to the bag. The bottom consists of a strip of metal having a hole in one end, through which the cord passes, the knotted end preventing its being pulled through. At the other end the cord has a handle. It is knotted near its middle and the bag-tie is notched, so that the cord can be placed in the notch and the knot will hold it from running through.

The method of using this device is: The cylinder is placed within the bag and is filled with ashes or garbage. When the refuse is to be collected the cylinder is lifted out from the bag, being first detached if necessary. The flaps in the bottom of the cylinder open downward and allow the refuse to fall out from the bottom of the cylinder and be left in the bag, which is closed up when the cylinder has been withdrawn by withdrawing and fastening the drawing-cord. The cylinder is then placed in a fresh bag and is left ready to receive another supply of refuse, the original bag being removed and placed upon a cart to be carried away.

If desired the cylinder may be made without a bottom, and in some cases this is the simplest and best structure for use, the cylinder acting to support the bag and protect its sides from the hot coals which may be thrown into it. In most cases it is desirable to provide the cylinder with a bottom capable of removal or opening in some way.

The cylinders have comparatively little wear, as they are never rolled on the sidewalk and banged on the cart in dumping, as with the ordinary ash barrel.

### American Paper in England.

MR. PASSMORE EDWARDS, proprietor of the London *Echo*, which is reputed to have the largest circulation of any daily paper in Great Britain, in an address not long ago, after laying the foundation stone of a technical school building given by him to his native county of Cornwall, made a statement which surprised his hearers and which had the desired effect of setting them thinking. Alluding to the fact that some London and some provincial papers had been deposited in the cavity of the stone, he said all the London papers are printed at the present time by machinery made in America or in France and almost all of the paper that is used in the daily press of London is produced in America. Not only are the London papers using American made paper, but in a few months they will be using American-made ink. Mr. Edwards humorously referred to the experience of his fellow traveller from London, the architect of the new building. Before leaving he bought a small clock for 15 shillings, being attracted by its cheapness and good make. On examining it on the way down he found that the mechanism was made in America and the frame in Germany.

STEPHEN L. MERSHON, of New York, has devised a new process of making steel which he claims to be an improvement on the Bessemer process. The latter method is to blow cold air through the molten metal, which causes the formation of a gas by the combination of oxygen and carbon, and thus gets rid of a portion of the latter substance, and by oxidizing the manganese and silicon converts them into cinders, which can be easily drained off in the molds. The promoters of the Hawkins system, as the new scheme is called, claim that they not only effect these changes, but also get rid of the remaining two substances which need to be extracted in order to convert iron into good steel. These are sulphur, which tends to make steel porous, and phosphorus. Both materials are abundant in Southern iron ore and greatly lessen its commercial value. The process consists of sending simultaneous blasts of hot air and steam at right and acute angles, respectively, into a falling stream of molten iron. This, say its supporters, will effect all that the Bessemer process does by means of the oxygen, and the hydrogen will also deoxidize the sulphur, converting it into illuminating gas, which can be drawn off and used for lighting purposes, and changing the phosphorus into phosphorid pentoxide.

HARDLY a steamer has left the port of New York during the last three years which did not carry mining machinery from Chicago destined ultimately for the gold fields of South Africa. These shipments are certain to continue for some time, as the local concerns have orders which will keep them at work for some time constructing the machinery which the South African miner seems to be in need of.

—Shipments of soda-water apparatus have assumed large proportions. One firm recently sent upward of \$22,000 worth to England and \$15,000 worth to Mexico. Guayaquil, it is said, has also been quite a market for this apparatus.

### New Lightning Arrester.

ONE of the most important though smallest and least conspicuous of the appliances of a modern electric power plant is the lightning arrester or arresters. It is known that an electric discharge such as that producing a lightning flash induces heavy currents in near-by conducting circuits. The enormous voltages of the lightning flashes induce similarly high voltages in the conducting circuits, so that unless means are provided for safely conducting such induced currents to ground they will follow the network of wires back to the station, pierce the insulation and thus incapacitate the machines. An instrument which has recently been devised should satisfy all the conditions a lightning arrester ought primarily to fill—namely, that it be without self induction, as otherwise it would be ineffectual, since owing to the alternating character of a lightning discharge self-induction would offer an obstacle to its free path to earth; that any arc formed be automatically extinguished, and, finally, that it leave the arrester in condition to operate immediately for a succeeding flash, as they frequently follow each other in rapid succession, several in a minute.

The new arrester consists of two heavy copper wires bent in a peculiar manner and placed opposite each other. The wires are carried above and below on cast-iron caps cemented to porcelain insulators, and the horizontal low ends of the wires are inserted in bushings and can be moved in and out, so that the distance between them can be regulated. One of these wires is connected to the circuit to be protected and the other to the earth. When lightning strikes the circuit the current follows the disruptive path to earth rather than the longer circuit of the wires back to the station, so that an arc is formed there which travels upward and is extinguished in a few seconds. Experiments show that the higher the potential the more effective the apparatus. Ten thousand-volt discharges do not pit the surface of the wires, while lower voltages do and burn steadily at the lower end of the wires, and consequently are not extinguished, while the high voltage discharges are driven upward and blown out. The magnitude of the arcs that may be dealt with in this simple manner will be appreciated when it is stated in the experiments which were made the arc flames rose nearly 10 feet in height, but were extinguished quickly and automatically.

### American and Foreign Furs.

THE exports of American furs, obtained chiefly in Alaska, amount to \$4,000,000 in a year, and nearly 70 per cent. of them are sent to England. The importations of foreign furs or manufactured articles into which fur enters as the chief material amount in a year to \$10,000,000, or more than twice as much as the exports. The American trade in furs has been largely stimulated by the yields of Alaska. From 1870 to 1890 the Alaska Commercial Co. paid to the United States \$50,000 a year and \$2 for each seal taken for the sole privilege of taking seals in Alaska. The sealskins, in casks holding from 200 to 300 each, are shipped through San Francisco and New York to London. From 1868 to 1890 2,412,000 sealskins from Alaska were sold in London.

The average annual collection of furs on United States territory is as follows: Badger, 5,000 skins; bear, 15,000; beaver, 200,000; buffalo, of no account; fisher, 12,000; fox, all kinds, 150,000; marten, 130,000; mink, 250,000; muskrat, 3,000,000; opossum, 250,000; raccoon, 500,000; sea otter, 2,000; skunk, 550,000. In 1890 there were 484 fur establishments in the nation, of which 281 were in New York, and though there has been a decline in late years in the popularity of some fur garments, in consequence of the mildness of the Winter seasons, the business in American furs of the cheaper grade is on the increase, and a proof of this is found in the fact that while the exports of furs from this country were larger in 1896 than in the year preceding, the importations of fur goods declined.—*New York Sun*.

A COMPRESSED air locomotive is about to be operated experimentally on the New York elevated railway system. In general appearance the locomotive, named the "Hardie," much resembles the ordinary steam locomotive. The space usually occupied by the boiler, however, is taken up by the storage tanks for the air and by the reheater. On this locomotive the air is stored in 36 tubes of Mannesmann rolled steel; they are 9 inches in diameter and of varying lengths, from 13½ to 21 feet. The charging pressure is 2,000 pounds per square inch. The air is led from these tanks through the reheater, in which water is stored at an initial temperature of 350 degrees Fahrenheit, and after passing through three reducing valves is admitted to the cylinders at a pressure of 100 pounds. The working cylinders are 13½x20 inches. It is expected that this locomotive will haul five cars and make a run of 13 miles between charges.

UNITED STATES CONSUL MONAGHAN, of Chemnitz, says that though Germany imports but little of our machinery or tools, the prices being too high, still she builds almost all her wood-working machinery on American models or modifications thereof. For example, there is a large factory for making wood-working machinery in a suburb of Chemnitz. The directors were at the Philadelphia and Chicago fairs; they bought American machines and copied them, adjusting and changing them to meet German tastes, prejudices and circumstances. The firm is very successful.

—A jeweller, of Knoxville, Tenn., has completed a novel device in the shape of a visible clock; that is, the entire mechanism, being constructed of glass, renders the movement perfectly visible. It is equal to any full-jewel movement and there is only one bearing which does not work in the glass frame. The pallet is jewelled, and the pendulum rod is adjusted to regulate itself against the action of both heat and cold. The clock stands 6½ feet high and is 21 inches wide.

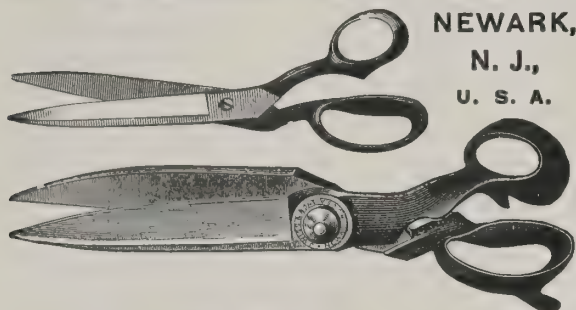
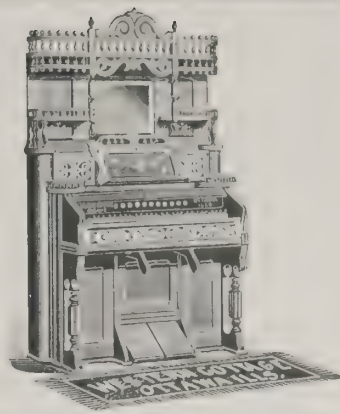


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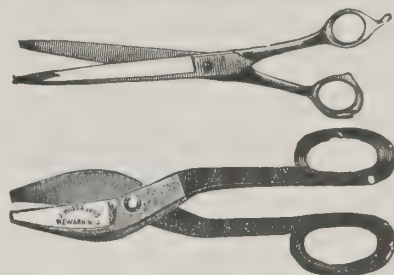
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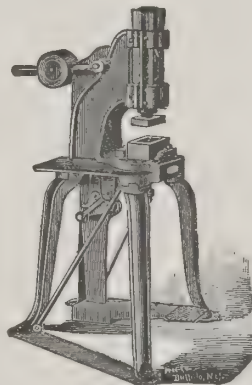


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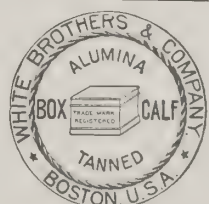
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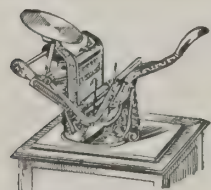
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WORLD'S COLUMBIAN EXPOSITION,  
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### Fischer Enamelling Process.

SUFFICIENT importance is attached by the Franklin Institute, Philadelphia, to the new Fischer method of enamelling marble to make it the subject of an official investigation and report. The plan consists in imparting to marble a glazed or polished surface by submitting it to the action of hydrochloric acid for a certain time. This glazing solution is composed of one part acid and seven parts water for general use, but for action upon very hard marbles a stronger solution having only five parts water is employed. The action of the dilute acid upon the marble immersed in it is to attack every part of the surface, slowly dissolving the same and causing it to assume a glossy appearance without relatively changing its shape—that is, as the acid is equally active upon the entire exposed surface of the stone, the minute crevices are treated to the same erosion as the prominent or flat surfaces and the result is uniformly perfect. The report adds that though of necessity the marble is eaten away somewhat and very sharp sculpturing is likely to be slightly rounded, yet if the action of the acid is not prolonged unnecessarily, not only does no serious injury result, but a finely polished surface is produced over every exposed part of the marble, such as is impracticable to equal by any mechanical method now in vogue.

### Big Smokestack.

WHAT is considered quite a feat in building a high brick smokestack has been completed at Niagara Falls. This stack is 160 feet high and stands on a foundation of hardpan five feet below the surface of the water in the river. It is 16 feet square at the base and its inside diameter is 90 inches. In its height it tapers three inches every ten feet, and at the top its outside diameter is 13½ feet. At the top it is surmounted by a cast iron cap weighing about 8,000 pounds and which is 5½ feet high and 7½ feet inside diameter. The chimney has an inside core wall for two thirds of its height to provide an air space. The design of the stack was partly original and partly from the high chimney construction of Manchester, England, where extremely high stacks are used. The construction of the chimney has excited especial attention from the fact that it was erected with an outside scaffold and also because of the fact that the masons finished their work on it in 153 hours. In high chimney construction like this it is the usual custom to place the scaffolding on the inside, but in this case it was decided to adopt the outside scaffold idea in the erection of the chimney. This plan was found very successful and the brick and mortar were elevated by a double elevator operated by steam without an accident of any kind.

### The File Trade.

THIS is a trade in which the introduction of machinery has had most gratifying results. Sir Frederick Mappin was one of the first, if not actually the first, to use file-cutting machines. He had to meet strong opposition, but he put his foot down and overcame the hostility. Others followed, with the issue that all German and American competition was "stalled off." At this moment the file trade is in a most prosperous state, the prejudice against machine-cut files is beaten down, and the hand cut ware is less and less in use. One firm who make a specialty of file-cutting machines are so busy that their work in hand is adequate to keep them employed for a year. In certain classes of small files, however, the Americans appear to beat local makes. In a large electrically driven steel establishment devoted to railway specialties there were recently shown to me a large quantity of very fine files, of tiny sizes, all from the States. The proprietor told me he could get no such files in England, and the workers declared they were absolutely perfect for the purpose they were needed for.—*London Hardware Journal*.

### Turquoise Mining in New Mexico.

A COMPANY composed of Indianapolis citizens are operating a turquoise mine in New Mexico. The mine is near Turquesa, about 20 miles from Santa Fé, on an arid plateau 7,500 feet above the sea level. A chain of hills over 600 feet high rises about the plateau. A member of the Indianapolis company who returned from the mine shows a number of cut stones as samples of the product of the mine. These samples range in weight from 8¾ karats to ½ karat, the largest stone being valued at \$100.

The process of mining is still very crude and dangerous, as the drilling is all done by hand and then the rock blasted with dynamite. Not much water is used in the process, which is a fortunate thing, as it has to be carried two miles and costs 50 cents a barrel. The assay for gold in the Indianapolis mine shows about \$7.50 to the ton. This mine is 60 feet deep. There are in all 20 men at work in the new Mexico turquoise mines; the American Company have ten, the Indianapolis Company five and the Blue Gem Company five.

The New Mexican varieties are of several shades of blue, of which azure predominates. The Americans are said to prefer the azure, the English the dark blue and the Russians the greenish blue.

—Our Western manufacturers are fully alive to the advantages of an export trade. A company of Milwaukee, Wis., which has in the past enjoyed a good business in South Africa, has been feeling the depressed condition of trade in that far-away country, but has lately secured several satisfactory orders. It made a shipment recently of one 3,000 horse power Reynolds-Corliss type engine, and will very soon forward two more 500 horse-power of the same type that it now has in process of construction.

### A Travelling International Exhibition.

THERE is now in process of organization a United States Trades Exposition, which is an undertaking for making a thorough exhibition of American products and manufactures to the people of Mexico. It is to consist of a long and complete vestibuled railroad train, loaded with typical and up-to-date American goods, arranged in attractive and instructive form, the train to make a six months' tour of our neighbor republic, stopping at twenty-seven of its principal cities, and giving everywhere free exhibitions. The stops will vary in duration, from two to three days in the smaller towns to three weeks in the City of Mexico. Space in the cars will be let to exhibitors as in other expositions, and every facility will be provided for the secure transportation and most efficient display of goods exhibited. The exhibits may or may not be accompanied by men to explain and look after them. Advertising space outside the cars will be allowed in proportion to the space occupied within. The train is scheduled to leave Jersey City on August 3d, and will run throughout as a special, doing as much as possible of night travel. The distance travelled will be over 10,000 miles. The undertaking has the indorsement of President Diaz, of Mexico; Hon. John Sherman, U. S. Secretary of State; Hon. Lyman Gage, Secretary of the Treasury; Señor Matias Romero, Ambassador and Minister Plenipotentiary from Mexico to the United States; also the sanction and approval of the National Association of Manufacturers of the United States, who are directly interested and will participate in this movement to increase our export trade with our sister republic. The business manager of the enterprise is J. D. Prince, Temple Court, New York City.

A PARTY familiar with the Japanese market demands says that if more of an effort was made by machinery manufacturers to introduce their wares in Japan the volume of business done would be better distributed among the various manufacturers. As it is at present there are only six or eight machinery manufacturers in this country that are favorably known to Japanese merchants. Proper introduction of new makers, he adds, tends to increase business. To be sure competition would be greater but the amount of business much larger. Out of the many car builders throughout the country there are practically but four or five catering to Japanese roads. The principal electrical transactions in Japan that have reached the United States have practically been done by three of the leading American companies. There are a number of other firms now trying to secure a share of the business, consequently it is estimated that 85 per cent. of the future Japanese business in electrical machinery and equipments will be obtained by American firms, even if the payments are made through European banking houses and the transactions controlled by foreign companies.

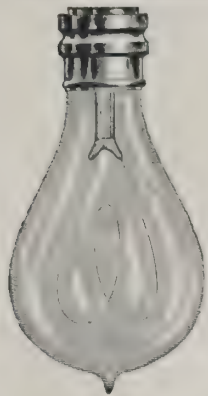
THE official test has proved that Boston's new propeller fire engine is a complete success. Six tests were made under the following conditions: Through one 200-foot line of 3 inch hose with a 1½-inch pipe; through 200 foot lines of 3-inch hose with a 1¼-inch pipe; these two lines siamesed into a 1½ inch pipe; then through a 2 inch pipe; through one 50 foot line of 3½-inch hose with a 2 inch pipe. The steam pressure averaged about 125 pounds. All of these tests were very satisfactory. The firemen present estimated that the siamesed streams would be efficacious from the street to a height of eight stories of a building, and when the short line of big hose was used with a 2-inch pipe the deluge would have bored a hole in a brick wall in short order. An electrical register was used to determine the amount of water the engine pumped, and showed a maximum of 1,550 gallons to the minute, corrected measurement. This was accomplished at a speed of 443 revolutions and is 200 gallons in excess of the contract requirements of the engine.

THE British steamship Magda sailed from Bangor, Me., not long ago with a heavy load of lumber for London. The Magda came across from Genoa in water ballast, making the trip in fourteen days. She is one of the largest steamships that has ever been in that port. She is 1,456 tons, net, and about 2,000 tons gross, and has a capacity for 2,000,000 feet of lumber. She was chartered to load here by a Boston firm who had placed the big order for 10,000,000 feet or more of deals with the lumbermen on the Penobscot River. The Magda is only one of a fleet of steamers that will be loaded here before the season is over. The second steamer, the John Bright, is even larger than the Magda, having a capacity for 2,600,000 feet of lumber. She is 1,734 tons net.

THE wife of a dry goods merchant returned recently from Europe and brought back with her, among other things, a piece of printed cotton fabric which had caught her fancy in Paris. She paid at the rate of 25 cents per yard for it. Her husband, when he saw it, thought it strangely familiar, and no wonder, for when he opened it out he found that the ticket on it was that of an American printing concern whose goods he was in the habit of handling and of selling this particular line at not more than 10 cents per yard. It is pleasing to add that domestic relations stood the test of this discovery.—*New York Journal of Commerce and Commercial Bulletin*.

AN American company is filling an order from Glasgow, Scotland, for 500 bedroom suites while getting out its goods for the home market. The American styles have to be considerably modified for the Scotch market, the changes making the goods look more old-fashioned. The company's Glasgow agents wrote in their last letter: "We are getting the goods more a-field now, and expect to be able soon to send you a big order." There are large furniture manufacturing concerns in Scotland, but the Americans undersell the Scotch makers of oak furniture.





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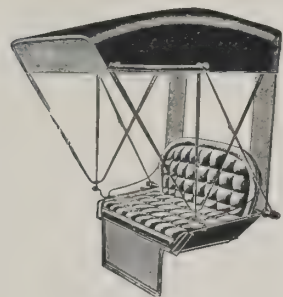


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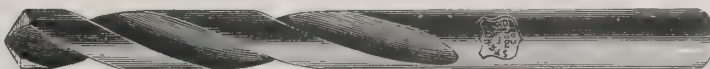
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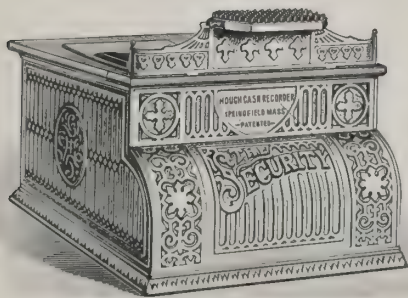
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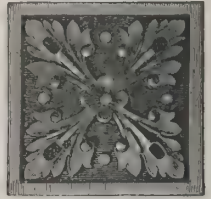
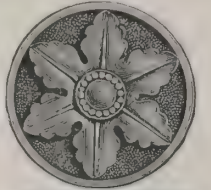
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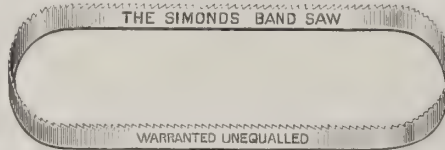
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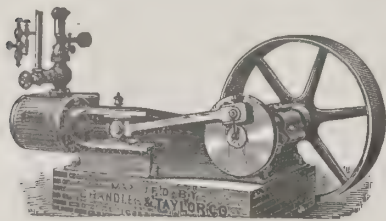
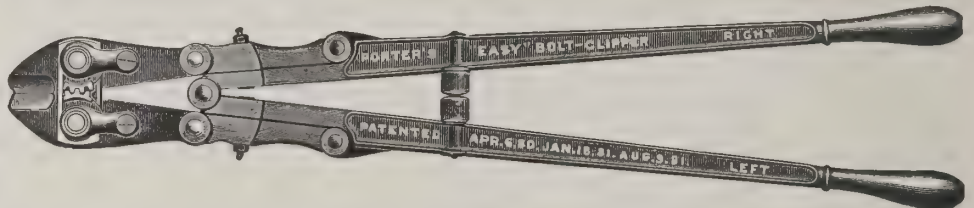


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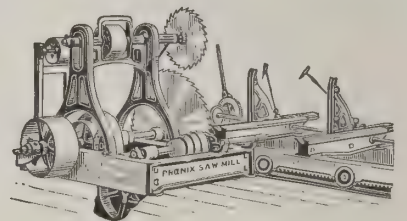
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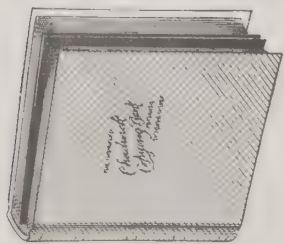
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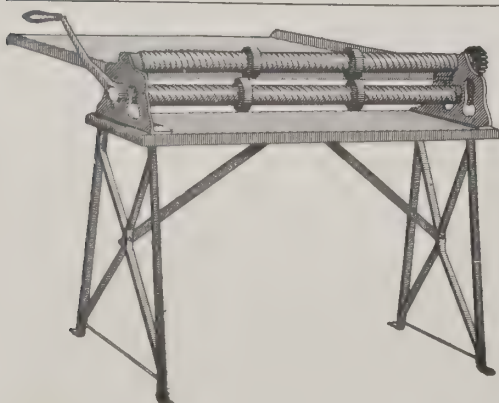
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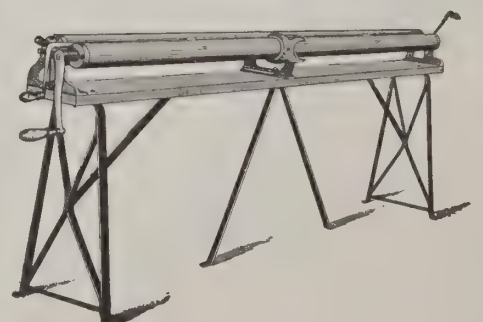
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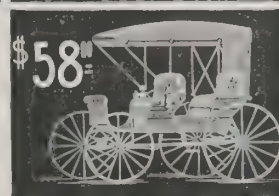


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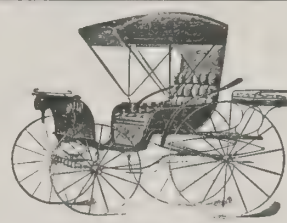
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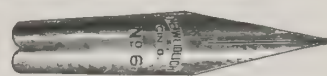
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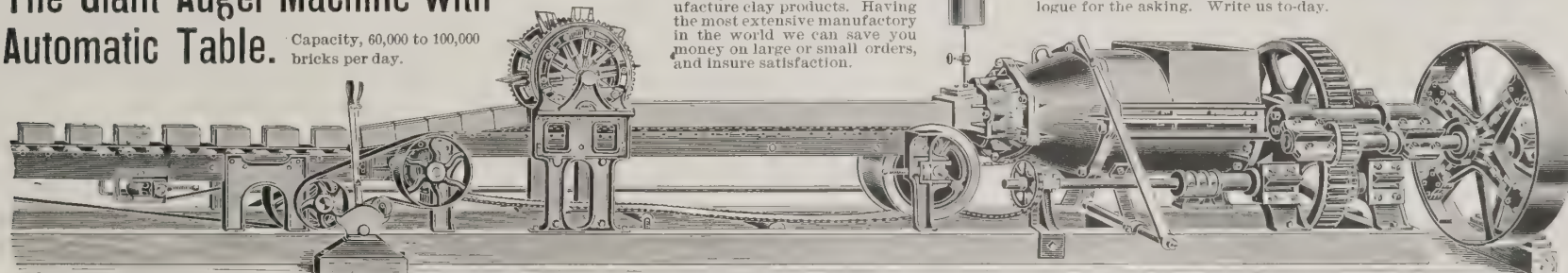
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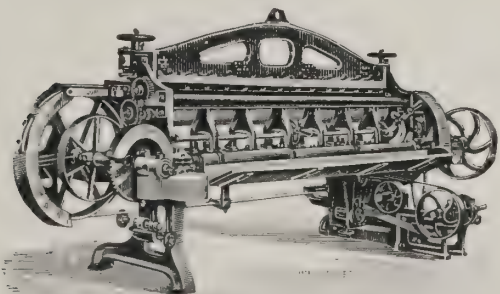
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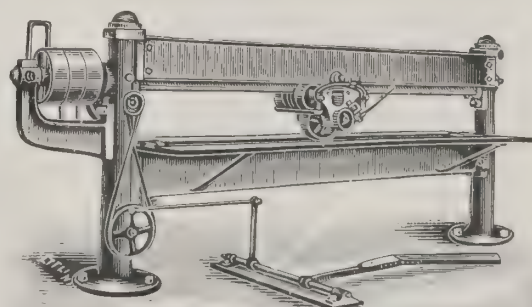
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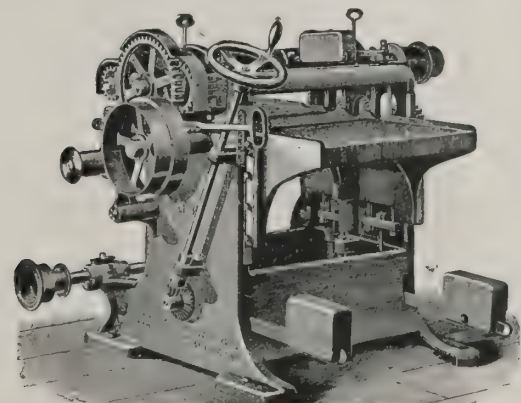
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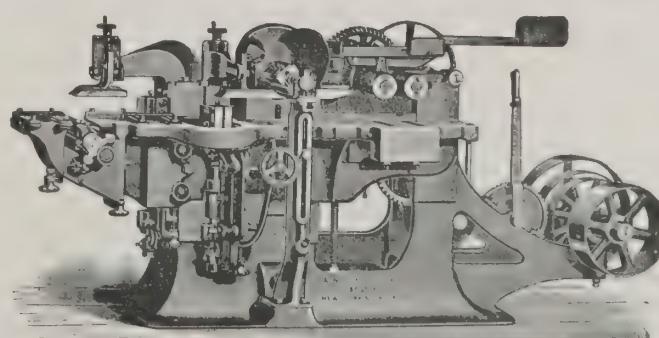
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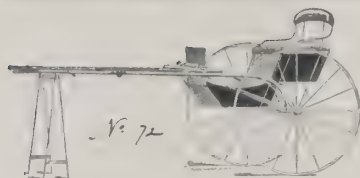
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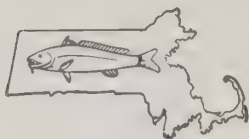
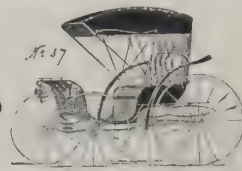


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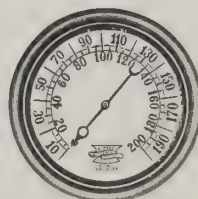
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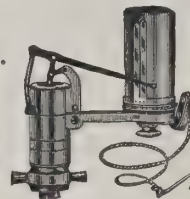
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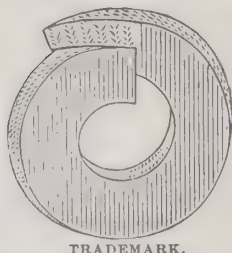
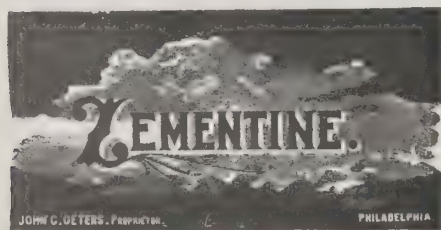
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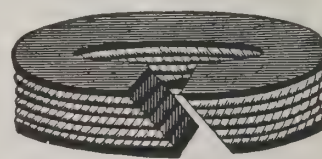
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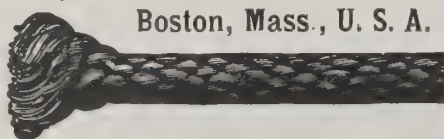
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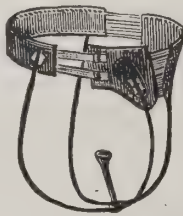
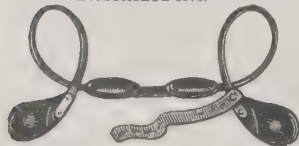
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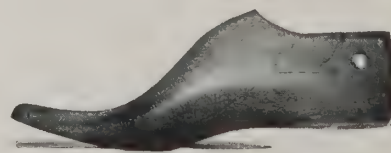
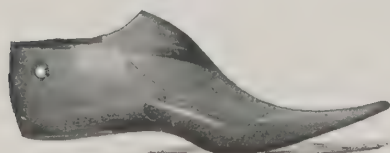
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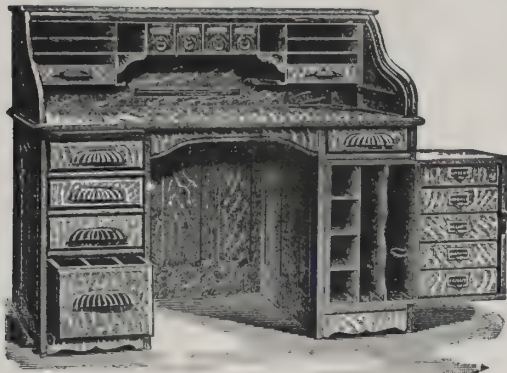
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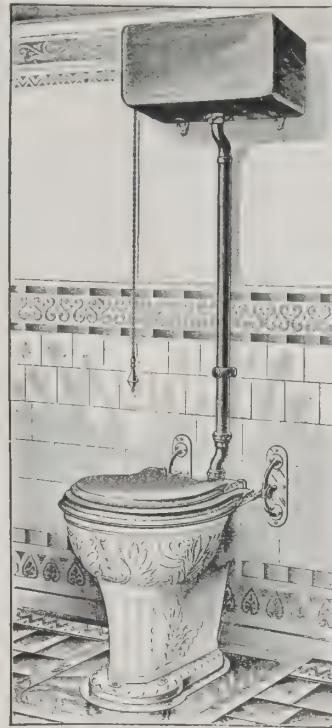
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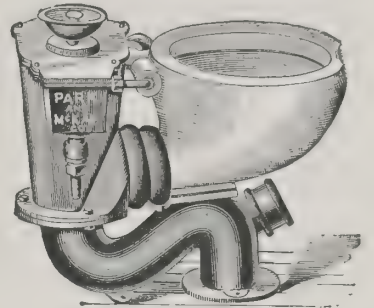


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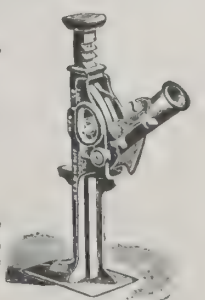
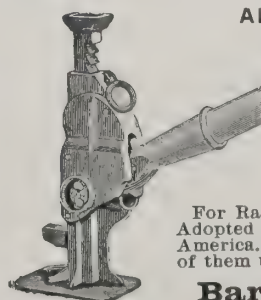
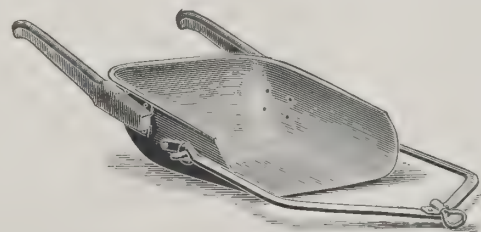
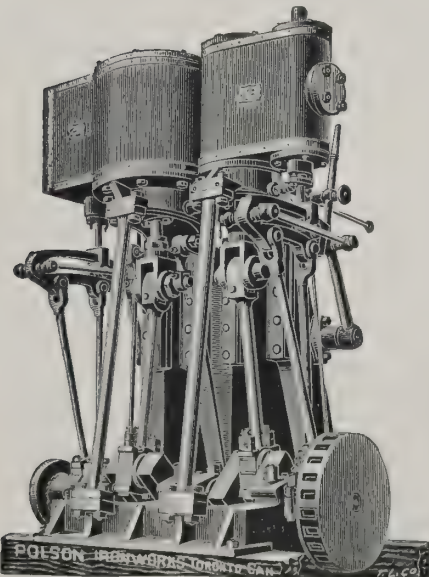
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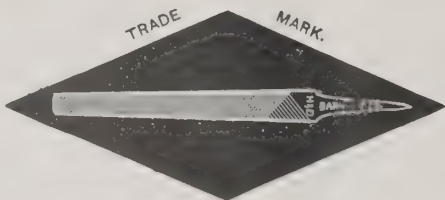
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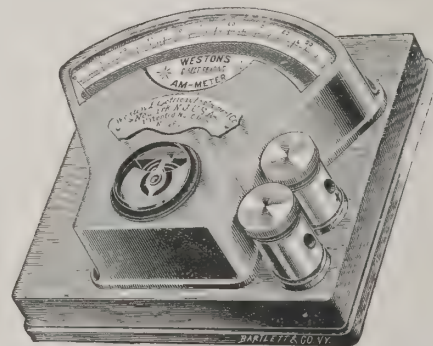
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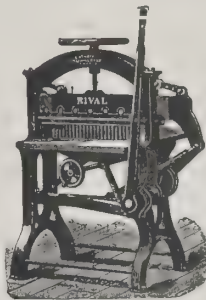
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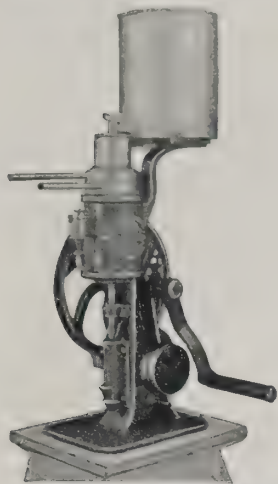
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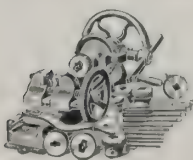
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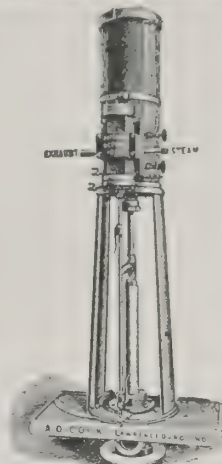


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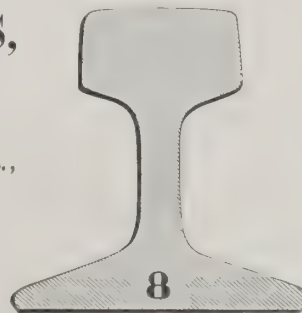
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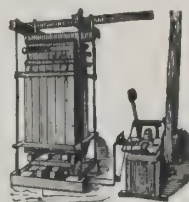


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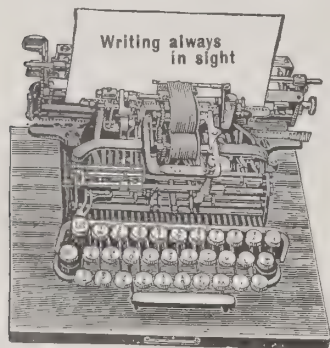
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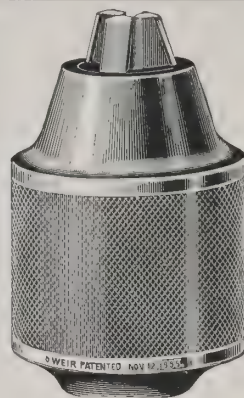


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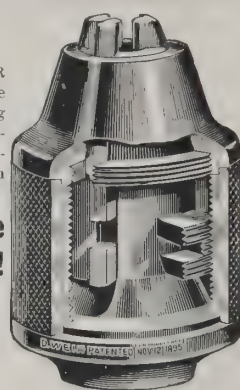
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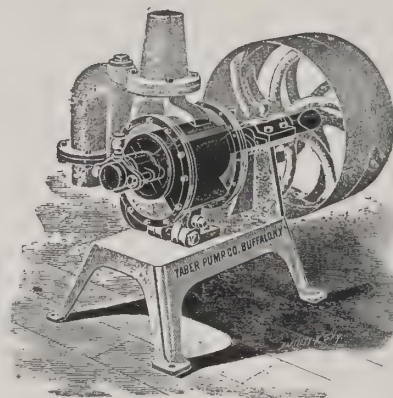
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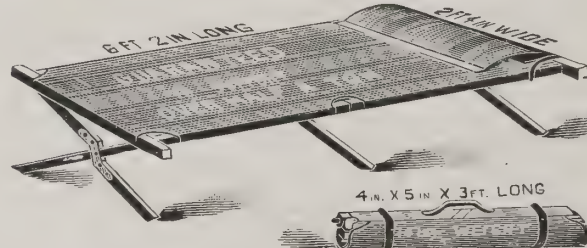
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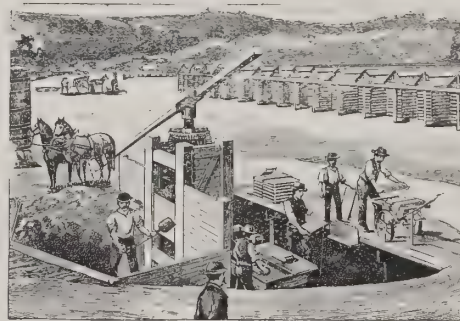
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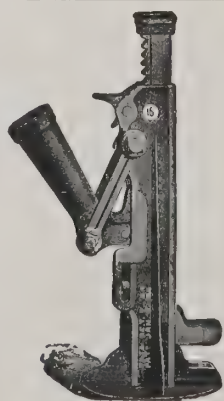
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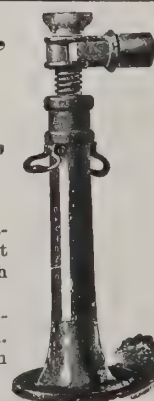
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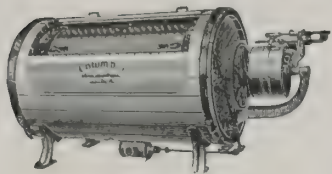
Send for catalogue and prices.





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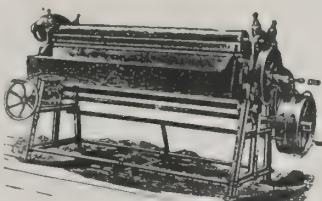
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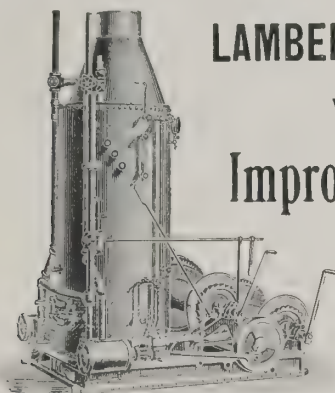
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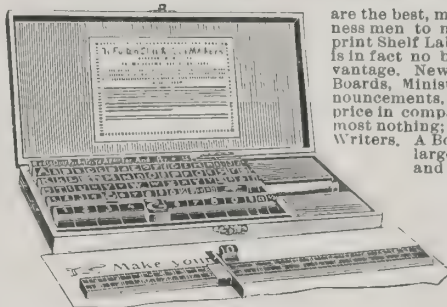
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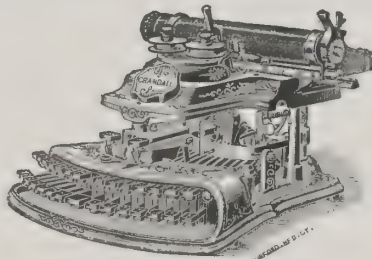
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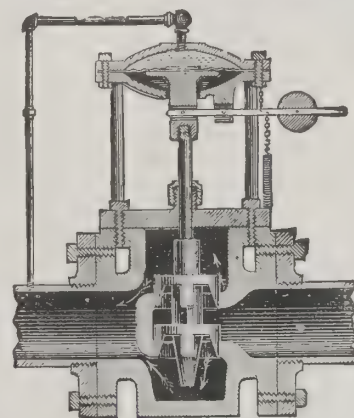
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Affords delightful amusement for old and young. Attractive and simple in construction and operation. Complete outfit, seating 56 people, with galloping horses, chariots, organ, engine and boiler, ample tent. Send for Illustrated Circular, Prices, etc., to the Manufacturers.

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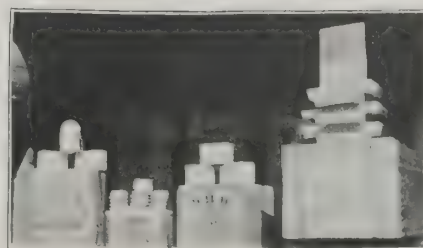
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Plain blocks of 7 1/2 lbs. In cases of 250 lbs. White Wax.—Plain round cakes in 2-lb. parcels in cases of 72 lbs.

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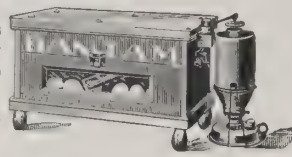
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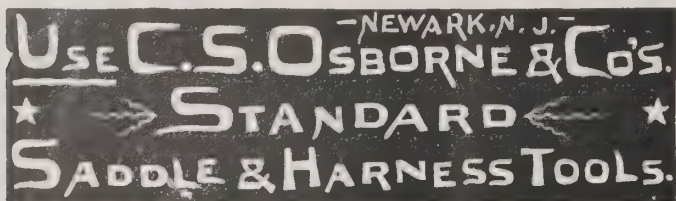
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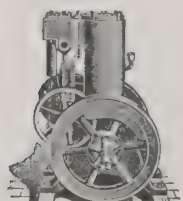
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DOESN'T GET OUT OF ORDER.

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Has no equal for Shops, Factories, Dynamos, Hoisting, Pumping, Mills, Boats, Printing Offices, Traction, Road Wagons.

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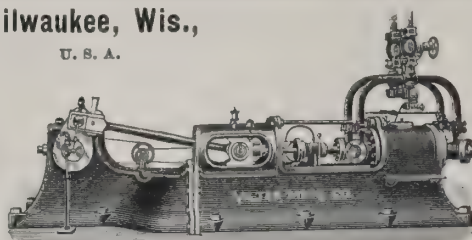
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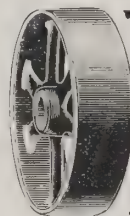
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ON DAYTON PATROL WAGON.—1 Set of our 1st Quality B. S. B. Wheels, No. 32, went into service May 1, '88, and rolled into July 1, '95, with 28,852 miles' service.



In 1888—2235 Miles, May 1st to Jan. 1st.	
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1895—2344 " " " " July 1st, '95.	

(This set replaced a set of Sarven Wheels that were in use one year.)  
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With Patent Metal Fingerboard, Superior Tone, Easy to Play, Neck cannot bend, Patent Unremovable Bridge, Quick String Attachment.

Finest Instruments Made.

Prices Reasonable.

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MANUFACTURED BY

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SAUER'S BAKING POWDERS, \$1.25 per doz. for lb. cans, F. O. B. New York. Write for Importers' Discounts and Agency.

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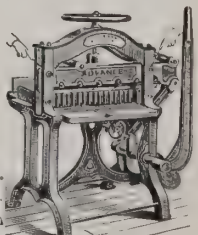
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16-inch, ... \$50.00	22 1/2-inch, ... \$90.00
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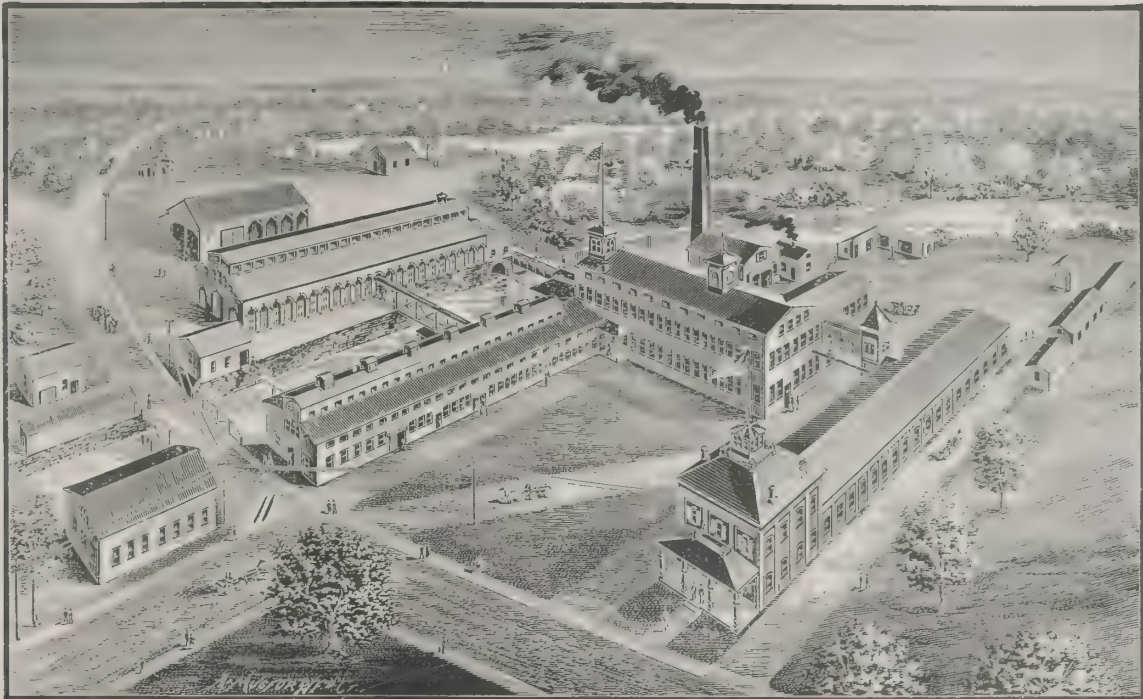


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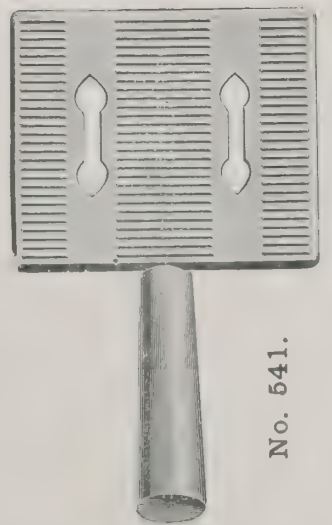
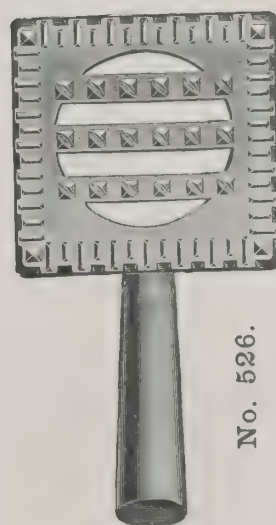
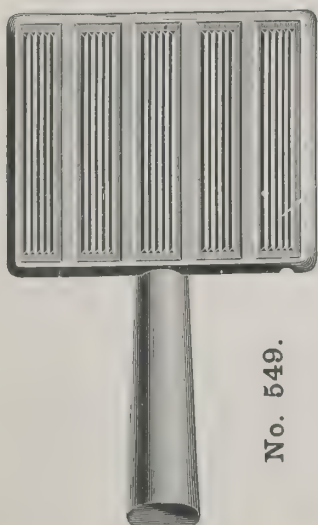
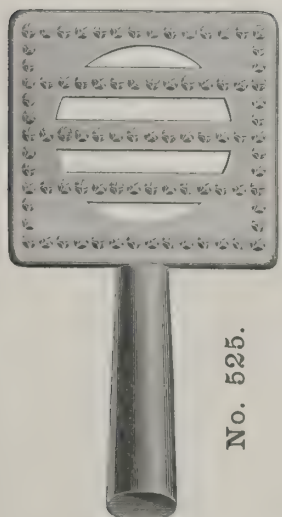
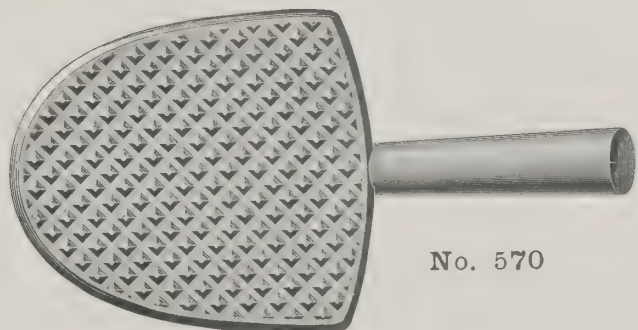
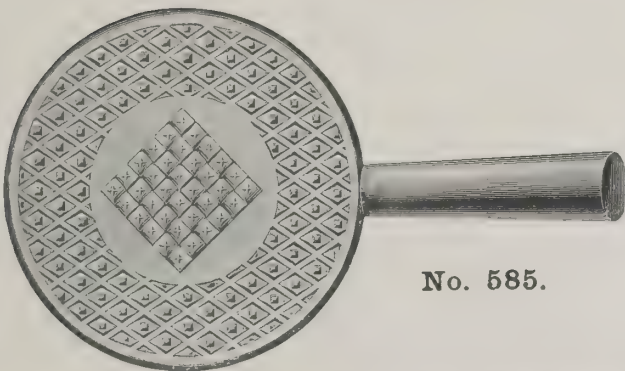
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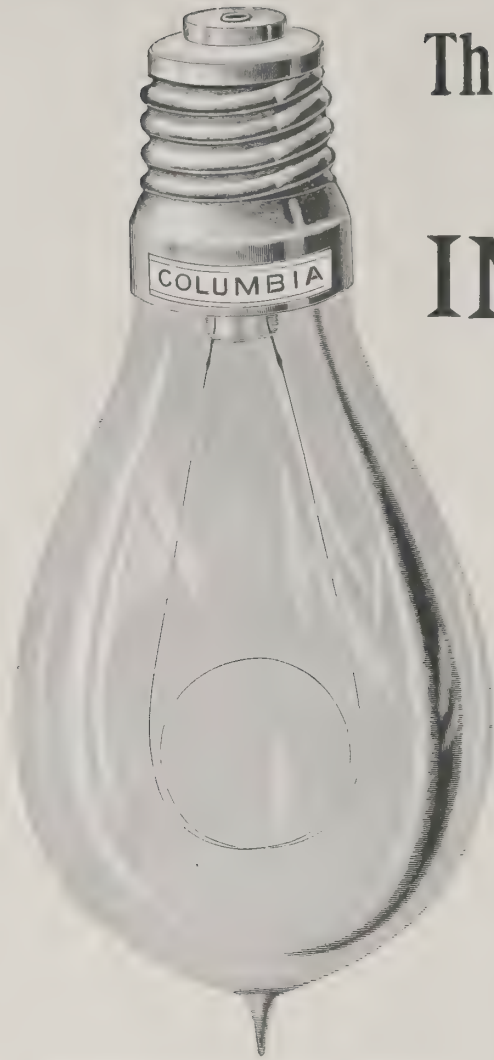


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Manufacturers of Strictly High-Grade

## INCANDESCENT LAMPS



The above cut shows exact size of our regular  
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Our product surpasses all others in maintenance of candle power and uniformity in consumption of energy. Owing to the high maintenance of candle power we specially request users to order lamps up to the maximum voltage at which they are to be operated. As the lamps do not grow yellow with age, they should not be operated at an excessive voltage.

We manufacture in all voltages ranging from 45 to 145 and from 200 to 250 volts.

Write direct to factory for catalogue, price list and other information.

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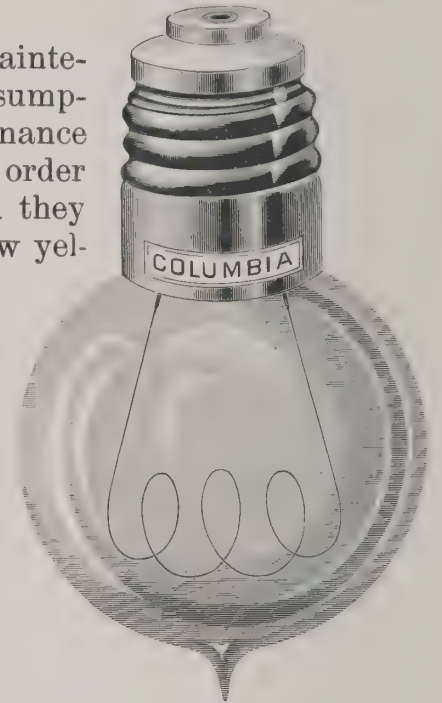
THE COLUMBIA INCANDESCENT LAMP CO.

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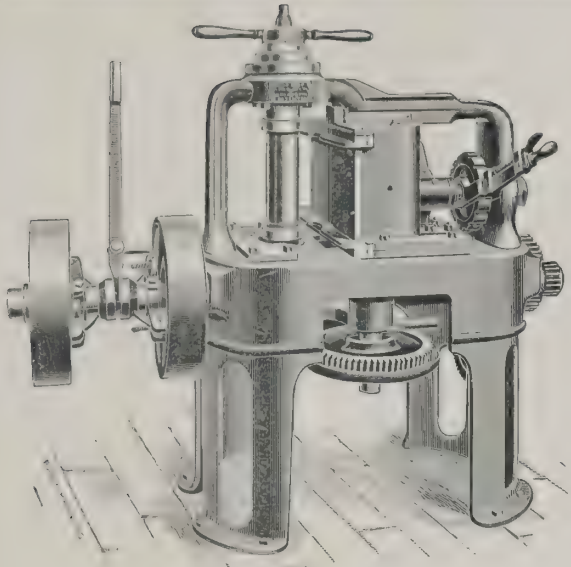
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We are now mailing our "Standard Ledger Diary for '97." Have you  
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If not, write for one, mentioning this advertisement.





WEIGHT, 2,500 LBS.

## Drop Carving Machine.

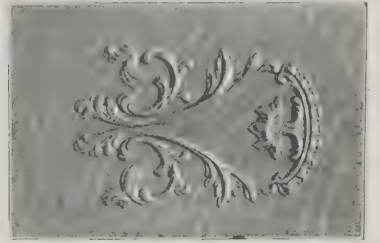
CARVINGS OF ANY DESIGN produced at the rate of fifty feet an hour complete, including sanding and scroll sawing. CARVINGS of any thickness from one-eighth of an inch to one inch in thickness. One of these machines will produce more CARVING in one day than ten hand carvers. Send for Samples and Circulars.

# Drop Carving Machine.

We guarantee the superiority of our machines in every single particular. Used in the U. S. and Canada by all first-class Furniture Manufacturers as well as several of the best Piano and Organ Manufacturers.

Our machines weigh from 2,500 to 4,000 pounds, possessing weight, strength, durability and adaptability to the work required never before attained in this line of machinery.

If you are interested send for Catalogue and Samples of work. Ask for Special Sheet of Drop Carvings.



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# UNION

EMBOSSING  
MACHINE  
COMPANY,

Indianapolis, Indiana, U. S. A.

## THE CHAMPION CART.

MADE EXPRESSLY FOR

### All Foreign Markets.

For rough roads there is no superior at the price. It is an easy riding Cart and very convenient, is ironed up well, is made strong and is well finished. Has a good large box under the seat for bundles and packages. Has cushion and lazy back, and is a nice Cart for a lady. The gearing is the best of hickory, the axle is solid steel and has double collars. The wheels are second growth hickory, Sarven patent with solid sand bands attached, the wood hub being entirely covered with iron. The felloes of wheel are protected by projecting round edge steel tire. This Cart is homemade of Virginia timber well seasoned in this climate, and will give better satisfaction and stand better in hot climates than others made in the North and West. Correspondence solicited. Shipments direct or through any good export commission firm.

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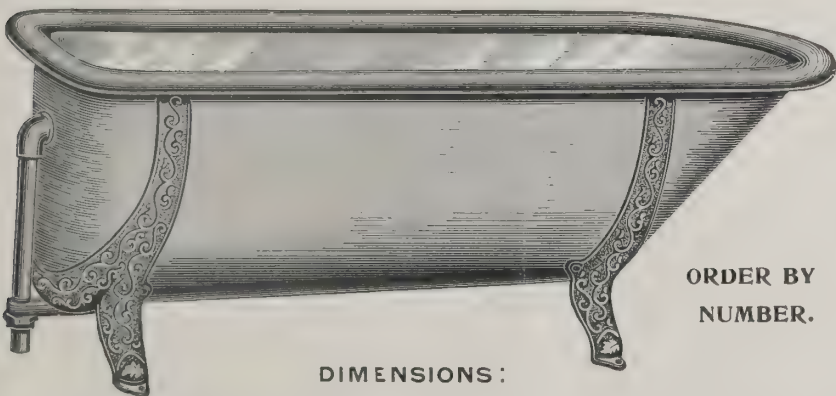
Price, \$20 00 each, f. o. b. New York.  
In lots of three, all packed together,  
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## Steel Cased Bath Tubs,

COPPER LINED.

Outside finish light gray, gold bronze trimmings. Nickel overflow, strainer, plug and coupling. Fitted for 4½ Fuller cock unless otherwise ordered. 3¾ in. centres. Hardwood rim, oak or cherry, with cabinet finish.



ORDER BY  
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DIMENSIONS:

Length outside rim, 4 ft. 6 in., 5 ft. and 5 ft. 6 in. Width outside rim, 28 inches. Depth inside, 17½ inches. Height from floor, 23½ inches.

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No. 38—4 feet 6 inches,	-	-	\$12.00	\$13.00	\$14.00
No. 40—5 feet,	-	-	13 00	14 00	15.00
No. 42—5 feet 6 inches,	-	-	14 00	15.00	16.00
No. 44—6 feet,	-	-	15.00	16.00	17.00

## The Champion Water Heater.

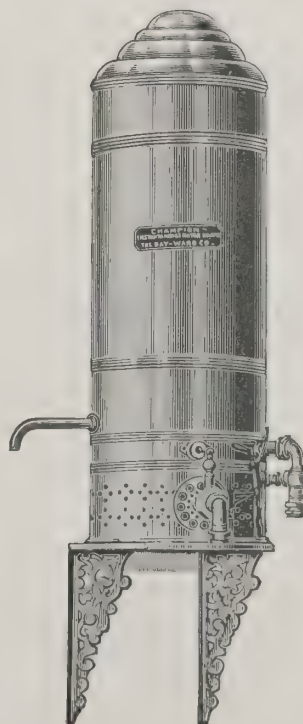
SUITABLE FOR BATHS AND  
DOMESTIC PURPOSES.

Will heat sufficient water for bath  
in 10 minutes with one foot  
of gas per minute.

The most simple, efficient and economical Heater ever offered, and at the lowest price. The gas and products of combustion are entirely separate from the water, which is thus kept pure and sweet.

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Copper, including shelf and brackets,	\$15.00
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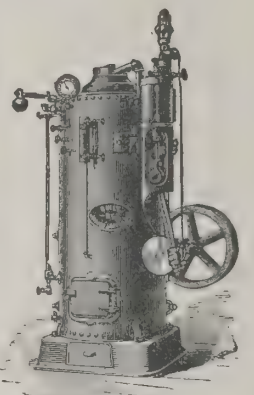
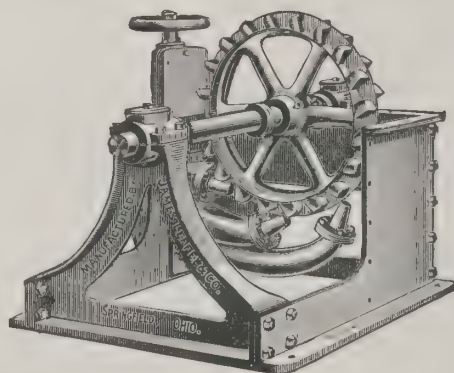
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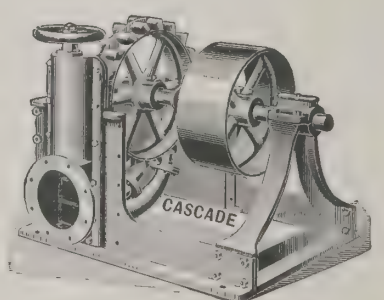
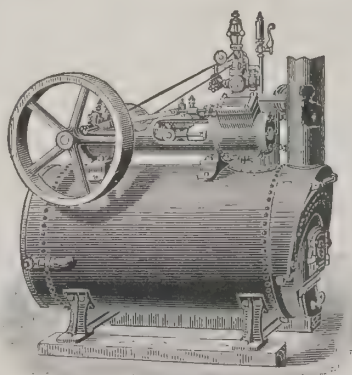
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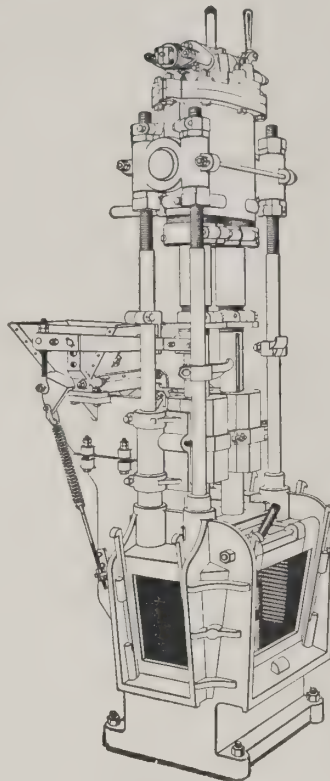
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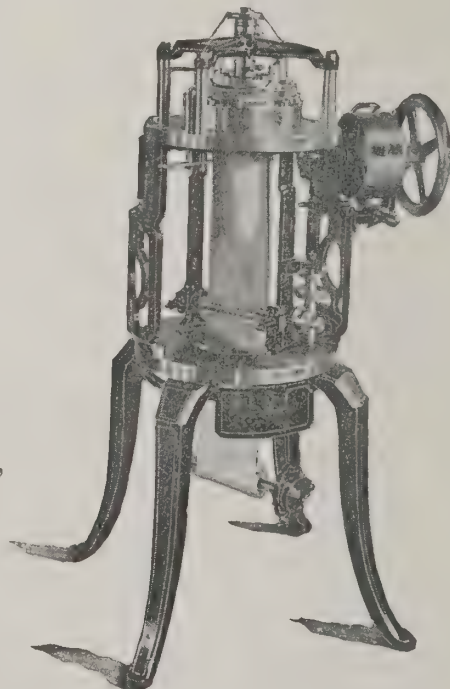
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### NEIGHBORS AND RELATIVES—PRICE AND QUALITY.

**F**ACILITIES for transportation by land and sea are the real promoters of international competition. This fact is well illustrated when as perishable and delicate an article as table butter can be so handled as to bring Danish, Australian and American products into competition in English markets. This competition is now being watched with keen interest. The questions involved are quality (usually expressed in color), style of packages, price on the counter of the retailer and the taste, which may be but another word for prejudice of the consumer. It is noted that many English consumers prefer Danish and Australian butters to the factory product of their own country, which, tested in every way by which quality can be determined, are superior. This preference is the result of prejudice, not of judgment. But prejudice is one of the most potent factors for determining the course of commerce. To overcome this prejudice the American Secretary of Agriculture is proceeding to buy butter in Illinois, Iowa and elsewhere for the purpose of having it packed in different ways, shipped to Europe and offered to the English consumer through his accustomed sources of supply and then taking notice of all reasons assigned for preferring other butters to the American product.

The little sentiment permitted in commerce is fast disappearing, evaporating, as it were, under the influence of international competition. While it is pleasant to deal with neighbors and relatives, it is a recognized axiom that price and quality must control. It follows from this that prejudice must give way and judgment be permitted to take its place. No one can determine whether a price is favorable or unfavorable unless he can determine the quality of the goods on sale. The determination of quality belongs to judgment, not prejudice. Judgment is the highest function of reason. In the domain of trade national loyalty and prestige, family ambition and pride, neighborly good will and commercial spirit all count for but little against a knowledge that really renders judgment competent to determine quality. Producers and manufacturers are not to be blamed if they make free use of all external considerations which may be expressed by the word prejudice for the purpose of securing orders. They will do better for the permanency of their trade, however, if they will educate their customers and improve their commodities so that they can rely upon judgment instead of prejudice for its continuance. Prejudice is all right when it is in one's favor, but it is liable to become unstable. The judgment of the intelligent is lasting. The course of progress tends in the direction of increasing intelligence, and to meet this successfully business must rest on judgment.

### AMERICANS AT THE PARIS EXPOSITION—1900.

**M**ANY causes conspire to induce American producers, agricultural, mining and manufacturing, to make the most notable exhibit of their productions ever attempted at the Paris Exposition in 1900. That they will do so is evident from the widespread and serious interest with which the occasion and its significance is being regarded.

To measure progress by placing in comparison the condition of the world, by countries, in 1800 and 1900, creating a marvellous object lesson, is an opportunity that can come but once to the living at the close and beginning of any century. So multitudinous and vast are the subjects that have a bearing upon the general interdependence of the world's commercial system, of which each country is an integral part, it is almost beyond the powers of any mind to grasp the whole and determine the true value of each to all. From the experience of the past the wisdom of the present is born. By the aid of experience present conditions must be analyzed, their components determined, their effective force measured and opportunities estimated. In this great Exposition the effort will be made by each country to show the multitude of things in which it has been a pioneer, and in their collective significance to prove for how much of progress during the nineteenth century the world is indebted to its enterprise, genius and industry. Such an exhibi-

tion will lead to a just appreciation by one for others between the nations and will go far toward creating a feeling of social fellowship which will be an enduring basis for commercial amity. Those who read the history of the century most accurately will regard the records of its wars as blots on its fair pages. Turning to the works of peace, which make for the comfort, health, education, prosperity and happiness of the people, they would willingly wipe out the record of a hundred battles if they could write in place of them the knowledge of one new art capable of administering, in a very simple way though it might be, to the well-being of humanity.

A most instructive feature—one that should go far to quiet the unrest that threatens the stability of civilization—will be the exhibit of the difference in environment, food, clothing, housing, education and material comforts and enjoyments that were the portion of the working masses in 1800 and that are their portion now. To illustrate: In 1797 the people struck their lights with a flint, steel and tinder box. They used no coal, no gas, no electric lights; tallow candles and sperm oil were their only illuminants. The ferry-boats were operated by horse power. Street railroads, steam railroads, steamships, telegraphs, telephones, steam power and electric power were unknown. Passenger and freight traffic was carried on between New York and Albany and the towns on Long Island Sound in sloops. In Winter stages on runners plied between New York and Albany on the frozen river. The stage-coach fare to Philadelphia was \$6. There were but four newspapers, all of them semi-weekly. Three mails per week were sent north and three south, on alternate days. Negroes were articles of merchandise. The kings and princes of those days could not obtain what the manual laborer enjoys to-day, and is so accustomed to that he feels little appreciation of his advantages and is tortured with a spirit of unrest that destroys his happiness.

The Paris Exposition of 1900 is America's opportunity to claim acknowledgment from the world of its indebtedness to the Republic for the many things in which its citizens have been the pioneers. From this country more than from any other there has radiated a knowledge of successfully developed improvements in agriculture, mining, manufacturing and transportation. Add to this a knowledge of its natural resources, and the people of every nation will find in America an original source of supply such as they have not before known. Such knowledge will stimulate international commerce throughout the world.

### NEW DEVELOPMENTS IN TELEGRAPHY.

**R**EPORTS are constantly appearing from independent sources of great improvements in the art of telegraphy. In some cases the improvements relate to the transmitting and receiving capacity of instruments; in others to the character of the electrical current employed increasing the carrying capacity of line wires, and in still other cases to the use of instruments and electrical oscillations that render it practicable to telegraph through any interposed obstructions without the use of wire conductors. Experiments in the latter field, made under the direction of Professor Pearce, superintendent of the English postal telegraph, have recently been brought to public notice.

Still more recently Mr. Nicola Tesla, one of America's most widely known electrical inventors, has announced that experiments made by him induce the belief that it may become possible to transmit messages through the earth and simultaneously to all points equipped to receive them—say to the foreign secretary of every government. Having reached this conclusion, it appears to Mr. Tesla to be an equally simple matter to transmit intelligence to the stars. The only obstacle to this seems to be that the star natives may not think it good form to enter into correspondence with persons to whom they have not been introduced. To those familiar with the daily transmission of communications through ocean cables the "star routes" do not appear impossible. That which has already been accomplished leaves no reason for doubting the sanity of a mind that entertains the bolder idea.

The electrical oscillators which Mr. Tesla has invented are



capable of interrupting a current millions of times in a single second. His theory is that if the static electricity of the earth is disturbed by vibrations at a given point the same vibrations may be felt and recorded at any other given point. He says he has secured excellent results through 20 miles of earth. He thinks his invention may be of the utmost importance in transmitting news affecting international interests throughout the entire world at the same moment, thus preventing wars and panics. Years of painstaking scientific labor have been devoted to research in this direction, and the indications are that success, with its reward, is near at hand.

### IRON AND STEEL.

IRON and steel enter so largely into the construction of all facilities for transportation, building and machinery it has come to be an accepted trade axiom that the production of iron and steel is a true index to the industrial condition of a manufacturing country or of the manufacturing world. For this reason the annual output of iron and steel is studied by those engaged in transportation and manufacturing as closely as the annual output of gold and silver mines is studied by world financiers.

The statistics and the deductions made from them, given by Mr. Edward P. Martin, president of the Iron and Steel Institute of England, in his recent annual address, have attracted wide attention. The showing made for England is very satisfactory in all principal departments except that of tin plate. The falling off in this item is attributed to American production, but it is shown that the demand from other countries is increasing, so that it is expected the English output will regain its former volume although the demand from America should wholly cease. Following is a brief statement of the statistics from England:

#### IRON AND STEEL.

	Total Production.
1896 .....	8 563,209
1895 .....	7,895,675
Increase .....	667,534

The production for 1896 is the largest on record.

#### STEEL RAILS.

	Total Production.
1896 .....	847,534
1895 .....	634,138
Increase .....	213,396

The production of steel rails in 1882 exceeded that of 1896. The increase for 1896 over 1895 seems to indicate that the era of depression in steel railmaking has closed and that a season of expansion is now in full course of development.

#### BESSEMER STEEL.

	Total Production.
1896 .....	457,261
1895 .....	441,550
Increase .....	15,712

This moderate increase over a former year that was satisfactory indicates a well-sustained activity.

#### MANUFACTURED IRON.

	Total Production.
1896 .....	1,198,584
1895 .....	1,148,012
Increase .....	50,572

This item shows the enormous use of iron in industries. The fact that the large output for 1895 was increased in 1896 shows growth of volume for all trades and manufacturing in which iron is an element.

#### TIN PLATE.

	Total Production.
1895 .....	366,000
1896 .....	267,000
Decrease .....	99,000

As previously stated, this decrease is accounted for by the growth of tin-plate production in the United States, causing a falling off of the demand from that quarter. Contemporaneous with this, however, there has been an increased demand from other countries, so that a part of the loss in the American demand has been already made good by the growth of the demand in other directions.

Statistics necessarily relate to the past. In regarding them

only nothing is found to indicate any loss of prestige by the "iron country," as England has long been designated. A review of the iron and steel production discloses the fact that the most potent cause which has been operating for the past fifty years to stimulate a demand for these products has been the requirements for transportation facilities. In England this took the form of iron ship-building and in the United States of railroad building. As a result the position of the two countries in regard to transportation is that of being competitors without entering upon the same field of operations. England controls ocean transportation. American manufacturers are feeling the disadvantages accruing from this, and are inclined to attribute much of England's ability to hold the trade in foreign markets to its command of ocean transportation facilities. Within its own boundries the United States owns about one-half the railroad mileage of the world. In domestic transportation, combining seacoast, internal waterways and railroads, the United States is supreme. Looking at the possibilities of close competition in the future, where price and quality are to be the determining factors, English manufacturers are pointing to the high cost of land transportation in their country as an important disadvantage which they must seek to overcome in order to be prepared to meet American competition. In a world view it is seen that England's advantage on the ocean is offset by America's advantage on land in the matter of cost of transportation, but the position of the two countries is not equal, because England cannot invade American territory to construct railroads and divide its control of land transportation, while America can invade England's ocean territory and construct a merchant marine that will divide England's control of ocean transportation. This will be the course of events.

There were three distinct causes for comment in the comparisons made by Mr. Martin between the position of iron and steel production in England and the United States—cost of land transportation, capacity of plants and supply of ores.

In speaking of the great iron and steel producing plants in the United States Mr. Martin drew attention to the fact that in their operation every mechanical device that could lessen cost was brought into service, which, combined with the enormous quantity of metal handled, brought cost to the lowest realized point. The plant of the Carnegie Steel Company at Duquesne, near Pittsburg, has furnaces capable of turning out 1,000 tons per furnace day. The rail mills, known as the Edgar-Thomson works of the Carnegie Steel Company, can turn out 2,000 tons in 24 hours. The Illinois Steel Company have turned out 38,000 tons of rails in a single month, while 1,600 tons per week is considered great work in England. American works can handle 500,000 tons of Bessemer steel per year. There are single mills designed to handle 1,500 tons per 24 hours. At the Joliet works of the Illinois Steel Company, near Chicago, a Garrett wire-rod mill handled 3,273 tons of No. 5 wire rod in one week, and is designed to run 728 tons every 24 hours. This work is done at a cost which makes the price of wire rods not more than \$4 per ton over the price of billets.

This great capacity makes a marked contrast with that of English furnaces, the average production of which for those in blast in 1896 was only 23,862 tons per furnace.

Added to the advantages of low-cost domestic transportation and manufacturing production in enormous plants utilizing every kind of labor-performing machinery America has the further advantage of an inexhaustible supply of ores, giving a great range in variety, admitting of a multitude of combinations to affect quality for various purposes. While England's mines are becoming exhausted, compelling its manufacturers to look to Spain, Germany, France and Belgium for ores and pig iron, the mines of America are not fully discovered. A recent estimate places the "ore in sight" in the Nussabi vein at 300,000,000 tons. The mines of iron ore in different sections of the country are capable of supplying all the furnaces in existence, operated at their fullest capacity all the time, for an indefinite period. There is no prospect of a diminution of iron and steel production in the United States on account of want of supply of basic ores, capacity of plants or restrictive trans-



portation. Having reached this point of development the indications all point toward an increased output, which will be more than sufficient for the home market, and will therefore enter into competition with other countries in the world's markets.

English iron and steel producers are now in the position with regard to American iron that English corn and wheat producers were with regard to American cereals only fifty years ago. A growth for the future, of which the growth of the past gives undoubted promise, will make American iron and steel as important a factor in international commerce as American cotton, corn and wheat now is. Herein lies the real significance of the present comparative positions of England and the United States in iron and steel production.

#### IMPROVED OUTLOOK FOR WHEAT EXPORTS.

NOTWITHSTANDING that the United States has encountered very considerable competition as a wheat-exporting nation during the past ten or fifteen years, owing to the increasing wheat-producing areas in various parts of the world, there are other commercial fields to be won apart from the congested centres of population in Europe which offer to the American exporter and prospective consumer peculiar advantages. As a matter of fact the United States control the existing trade in wheat and its products to a very material extent with Eastern Asia, the part of the globe to which we refer. While trade developments on this line, in a comparatively brief period, is a matter for surprise with regard to its extent, it is susceptible nevertheless of very material increase. The rapid strides in the acquirement of civilized methods which have marked the course of events in Japan, and to a lesser extent throughout Eastern Asia, would warrant the belief that new markets will be opened up for American breadstuffs and edible products generally throughout these populous nations. During the decade ending with 1896 the total shipments of wheat flour from the United States to Japan and China (including Hong Kong), according to the official trade returns published by the Bureau of Statistics of the Treasury Department, amounted to fully 6,000,000 barrels, and by far the larger part of this quantity was exported in the latter half of the decade. The amount exported during the fiscal year 1887, the opening year of the decade, was returned at 409,147 barrels. In 1896, ten years later, our shipments reached as high as 934,073 barrels, showing a gain for the decennial period of more than 100 per cent. Still further gains are indicated by the figures thus far available for the current fiscal year.

It will be observed that most of the wheat is shipped in the form of flour, grain exports to these parts of the world being comparatively light. It is noteworthy, however, that the bulk of the grain goes to Japan, where the grinding operations are carried on in the native mills. That the prospect for very materially increased trading in these lines is encouraging will be conceded when the controlling influences are considered. The capacity for wheat production of the countries in Eastern Asia, which include China as well as Japan, are inadequate to the needs of their large and growing population. The future will undoubtedly emphasize this condition in a corresponding ratio, basing the conclusion on the increasing divergence between the yearly averages of population and aggregate of native wheat crop output during the past ten years. Furthermore, it has been ascertained that the average amount of wheat annually consumed per inhabitant in Japan advanced from .30 bushel, or 23.2 pounds, in 1886-190 to .45 bushel, or 26.8 pounds, in 1890-1895. Accepting this increased figure as the standard, Japan still falls behind when compared with the principal wheat-consuming nations, the average of consumption being extremely low.

Frank H. H. Hitchcock, of the United States Department of Agriculture, in a paper recently issued on this subject, says: "In the United States the per capita consumption for food alone is estimated to be about 4 2-3 bushels per annum. It is therefore apparent that the potential increase in amount of wheat consumed by the Japanese people is very great. Placing the present population of Japan at 43,000,000 a rate of consumption per inhabitant equal to

that in the United States would make the total wheat consumption of the Kingdom reach above 200,000,000 bushels. With no increase in the present production of the country this would necessitate an annual importation of about 180,000,000 bushels."

A digest of the foregoing facts will point to the necessity of the American exporter of breadstuffs turning his attention to Eastern Asia, since the markets of Europe are well covered by American and the products of competing nations. The outlook from the standpoint of market conditions would appear exceptionally favorable for the prosecution of this trade at this time, as the United States will be in a position to dictate the price of wheat this year, by reason of a plentiful crop, the large shortage of the European crop, which is now practically assured, still further enhancing the situation.

#### GOLD AND SILVER PRODUCED BY ALCHEMY.

MANY romances have been written in which the production of gold and silver by alchemy has played a leading part. It is safe to say that these works of the imagination are dwarfed almost into nothingness by the researches of students of science in all ages and countries who have undertaken seriously the task of the artificial production of the precious metals. The many improbable things that have been accomplished forbid the practical men of to-day to deny the possibility of doing almost anything proposed in the line of mechanical or chemical science.

Recently a Mr. E. C. Brice claimed to have discovered a process for creating gold and silver. When he applied to the Patent Office for a patent on the process the Commissioner of Patents suggested to the Secretary of the Treasury the desirability of making a scientific test of the process before a patent for it should be issued. Experts were appointed to make the tests and the inventor notified to give them the necessary instructions. This he did, but as they did not succeed in creating either gold or silver the inventor claims that his instructions were not properly followed by the experts. This is possible. One thing appears to be certain: sufficient interest has been drawn to the inventor and his process, it is said, to enable him to negotiate an agreement with the English Government to give his process the complete test he desires.

This may result in London becoming the chief centre of gold and silver production in the world, as it now is the world's chief money centre. Such an outcome would be no more marvellous than are many things now within the daily experience of every person which his grandfather could not have thought of at all, because there was nothing in the experience of mankind to indicate their existence or probability. When imitation gold and silver are produced in such perfection that they cannot be distinguished from the genuine what will be the difference?

#### MECHANISM IN GUNNERY FOR WAR.

THE advance from the old flintlock musket, with its accessories of powder horn and bullet molds, to a gun that will fire 600 shots per minute with more than the accuracy of human intelligence is marvellous. This is accomplished by a new automatic Hotchkiss mitrailleuse. The mechanism of this gun loads, closes the breech, fires, opens the breech again, throws out the empty shell and introduces a new cartridge exactly as a soldier would do, with the advantage of not getting nervous or excited while in operation. How this is done will be interesting to technical experts only. That it is done will more vividly interest the great mass of young men who compose the rank and file of armies.

To provide for this rapid firing the cartridges are arranged one behind the other on strips of brass, where they are held in position by clasps. There are thirty cartridges on every strip. These strips are so arranged in pasteboard boxes that as soon as one is exhausted and automatically rejected it is only necessary to lift the lid of the box in order to introduce a new strip into the feeder. The successive and uninterrupted introduction of new strips makes the rapid firing continuous.

The gun is furnished with a butt and a shoulder brace, so that the



gunner may take careful aim. When in use it is mounted on a tripod, the rear arm of which contains a saddle on which the gunner may sit. The gun can be raised or lowered and turned to the right or left at will. The tripod also can be made as high or as low as needed, and the gunner may assume a standing, sitting or recumbent posture. Two men can easily carry it. Its total weight is only fifty pounds.

For transportation the gun and tripod are packed in separate leather cases. One mule can carry both cases together with a strong box containing accessories and a supply of ammunition. Supplementary ammunition packages are made to be packed by other mules. They contain thirty-two strips of cartridges each. The mitrailleuse can be mounted or dismounted by any soldier of average intelligence and without the use of tools. The motive mechanism, being rectilinear, allows of the use of the gun at any inclination, either above or below the horizon. Two men are needed to manage it with best results, but one man can do it in case of necessity.

The firing can be conducted slowly, at the rate of 100 shots per minute, or rapidly, at the rate of 600 per minute. This feature makes it unique among modern implements of war.

To offset this murderous weapon soldiers will need to be clad in bullet-proof clothing. Then the climax of improvements may be reached. With a gun that can be fired all the time and soldiers clad so they can be hurt none of the time the advance in mechanical war may be brought to a point where it will be a comfortable game of treasury tactics, to see which can buy the best equipments.

#### IMPROVED APPARATUS FOR DEEP-SEA EXPLORATIONS.

IT is said that the greatest depth ever attained by any diving device was 171 feet until last Summer (1896). A new diving device, invented by Mr. W. G. Smith, of Milwaukee, Wis., U. S. A., carried six men to a depth of 250 feet, where they remained for six hours. It is claimed that this bell is so constructed that it can be operated at a depth of 400 feet.

This bell is a cylindrical-shaped steel tube 8 feet high and 6 feet in diameter. It is not bell shaped, and has none of the mechanical arrangements of the old diving bells. Its constructors and owners will not permit its plans to be examined or photographed. It is made of 1-inch steel, and the tube is arched on top and bottom. It is fitted with glass windows which have been tested to a pressure equal to that of water at a depth of 400 feet. These windows are so constructed that should they break an automatic attachment will close instantly, without allowing water to enter the compartment. There are fresh and foul air pipes which connect with the surface, also a telephone. Outside of the case there is an arc lamp apparatus capable of generating a 250-candle-power light, which enables those in the bell to see a distance of about 100 feet when under water.

The most wonderful, and at the same time the feature which, next to its capability to resist water pressure, gives the bell its great value and power, is the arrangement which makes it possible to move the bell about on the bottom of the sea at the pleasure of the operators within it, without dependence upon the manipulation of cables from above. Attached to the cage and worked from the interior are several long arms. These can be used to move the bell about, to manipulate tools or for lifting weights. The bell is ballasted with water, and it is said, if anything should get out of order, by letting the water ballast out the bell can be made to rise to the surface. Some practical results have already been accomplished by the use of this bell.

In 1865 the *Perobic*, a Lake Superior steamer was sunk by a collision off Thunder Bay, Lake Huron. Upward of 100 lives were lost and treasure valued at \$140,000, also a valuable cargo of copper ingots. A suspicion has been entertained that the collision was not accidental. It is claimed that the sum of \$55,000 had been stolen from the Lake Superior Express Company's safe, and that the steamer was sunk to hide the crime. On this account many times the value of the steamer and cargo have been spent during

the last thirty-two years in attempts to locate and examine the wreck. The only successful attempt was made by the American Wrecking and Salvage Company, on June 7, 1897, by the use of the Smith diving bell, which is its property. The company have brought some of the cargo of the *Perobic* to the surface. They hope to secure the safe, and thus solve the mystery of the supposed robbery.

Encouraged by their success in locating this wreck the company propose to undertake the work of raising the North German Lloyd steamer *Elbe*, which sunk off Lowestoft, January 30, 1895. If this can be done a decided advance will be recorded in efforts to explore the sea, and many wrecks heretofore inaccessible will be made to yield up their cargoes and treasures.

#### Telegraphing Without Wires.

NICOLA TESLA, the electrician, declares that he has at length solved the problem of telegraphing without wires. He has, he says, produced electrical devices with which he can actually send and receive messages by a system which can be so applied as to make it possible for an operator in New York to communicate with ease and certainty with the people of any part of the earth, and perhaps even with those of the stars, if any of these are inhabited.

"The machines which I have completed," Mr. Tesla said when questioned, "will carry messages through the earth for a distance of twenty miles or so. I have sent and received signals with them, and I feel confident that I am not mistaken in saying that the problem upon which I have spent many days and nights is solved. Of course it is possible that I am mistaken. I have made mistakes before, but not many. I shall at once make machines which I expect will enable me to telegraph to any part of the earth as readily as I can within a limited distance by means of the ones I have.

"If I have a machine which will throw a stone from here to there," continued Mr. Tesla, pointing from the floor at his feet to the door of his laboratory, "then I do not need to doubt that I can make one which will throw the stone fifty miles if can control the necessary power."

Concerning the principles involved, Mr. Tesla said that the results were obtained by the use of his electric oscillator, recently patented. As long ago, he said, as when he was putting up telephone wires in Budapest he observed that electrical impulses were carried long distances without the intervention of wires. There was a telegraph cable one and a half or two miles away over which messages were being sent by the Morse code, and at times he could read these messages through the telephone. This set him to investigating the electrical condition of the air. He became satisfied that the messages were conveyed to the telephone wires by induction.

In 1890 he announced his belief that by means of electrical impulses of an extremely high rate, never yet attained at that time, bright light might be obtained from Crookes tubes, and in 1891 he made this announcement in London.

"I believed at that time that telegraphing might be conducted through the earth without wires," he said, "but I was afraid to say so for fear I should be laughed at and discredited by the older and abler men who were the leaders in electrical science."

It was not until 1893, when he appeared before the National Electrical Lighting Association at St. Louis, that he first declared his belief in the possibility of telegraphing over the whole earth without wires. Then he explained the general method which he believed would make this possible, if he could get a machine that would disturb the static electricity of the earth. In that year he had an electrical exhibit at the World's Fair in Chicago and among his visitors was Prof. Helmholtz.

"I spoke of my project to Prof. Helmholtz," Mr. Tesla said, "and told him how I thought it might be accomplished. 'Yes, it is possible,' he said, 'but it would take much power.' I was very much pleased with this admission by this great master and gratified that he did not condemn the idea, as many of my co-workers had done. I did not tell him then that I had already solved that part of the problem."

The solution to which Mr. Tesla referred was brought about through the work which he had done in developing his electrical oscillator, which he was working upon particularly in connection with the production of light from the Crookes tubes. The energy of the electric current, like that of flowing water, is displayed only when the current is interrupted. A familiar example of this may be seen in the common medical battery where the current flowing from one pole to the other may be passed through the most sensitive parts of the body and yet not be felt. Pass the same current through a Ruhmkorff coil, interrupting the secondary current by the vibrations of the commutator, and it will twist up the muscles of the strongest man and make him powerless.

Before Tesla's time interruptions of this sort had been produced only by mechanical means and could number only a few hundred a second. His electrical oscillator acts upon the principle of a bell, where a single stroke of the hammer sets the metal vibrating with a rapidly commensurate with its bulk, and these vibrations can be continued indefinitely by repeated strokes of the hammer at slow intervals. Mr. Tesla now makes oscillators which will interrupt the current millions of times in a second. In explaining the theory upon which his new devices for telegraphing over the whole earth works Mr. Tesla used a simple simile.

"Suppose the whole earth," he said, "to be like a hollow rubber ball filled



with water, and at one place I have a tube attached to this with a plunger in the tube. If I press upon the plunger the water in the tube will be driven into the rubber ball, and as the water is practically incompressible, every part of the surface of the ball will be expanded. If I withdraw the plunger the water follows it and every part of the ball will contract. Now if I pierce the surface of the ball several times and set tubes and plungers at each place the plungers in these will vibrate up and down in answer to every movement which I may produce in the plunger of the first tube. If I were to produce an explosion in the centre of the body of water in the ball this would set up a series of vibrations in the whole body. If I could then set the plunger in one of the tubes to vibrating in consonance with the vibrations of the water, in a little while and with the use of a very little energy I could burst the whole thing asunder."

This, Mr. Tesla said, would explain in a rude way how he proposed to set the whole of the static electricity of the earth in motion for telegraphic purposes, by taking advantage of the incompressibility and elasticity of the electric fluid. Then he told of some of the interesting results which he had accomplished in studying the theory and effect of vibrations. In one case he set a steel ring, 4 inches thick, vibrating, and by repeated but gentle continuations of the vibrations burst the ring. In another case he took a steel bar an inch in diameter, set it vibrating and kept it going until its internal disturbance was so great that first a section of the rod broke loose from one end and flew off and then another section flew off from the other end.

In applying these principles to the telegraphic purpose Mr. Tesla had first to work out the theory and then to make instruments which would set up the proper vibrations and others again which would catch and record them.

"I have perfected my machines and got excellent results," Mr. Tesla said. "I have thought of this system of telegraphing not as a mere commercial matter, but as a means of bringing the nations of the earth closer together. I conceive that the use of this system will not do away with the use of telegraph wires, but will on the other hand make more work for them. It is true that millions of my machines might be used without those of one lot interfering with those of another lot, but the manner in which I conceive that the system should be used is this: Have a machine at each commercial or political centre and send out from each place, under an international agreement, all the political, financial or other news to be read at every other part of the world at the same moment. The news could be distributed then over the wire lines or otherwise. Financial panics and even wars might be done away with if this were done."

Mr. Tesla says the transmission of signals is not the only result which may be achieved by his new scheme.

"This was what I at first thought," he said, "but from the results of my experiments I am now hopeful that I shall be able to substantiate another thing—the transmission of power from place to place."

If it were proved possible to transmit power without wires, and to considerable distances, it would solve the greatest problem which now constricts the use of electricity for many purposes.

"If ever we are able to communicate with the stars it would be by this method," Mr. Tesla declared.

When asked what the effect of electrical storms would be on his system, Mr. Tesla said they would undoubtedly interfere more or less with the working of the instruments locally.

Before the interview with him ended he made a statement regarding his Crookes tubes lighting system which will interest many persons.

"The system is now a commercial possibility," he declared. "I don't like the word 'commercial,'" he added, "but what I mean is that I have succeeded in bringing down the cost of the light so that it will compare favorably with other means of lighting."

Mr. Tesla took up one of the many lighting tubes which were lying about and, starting the current through one of his oscillators, held the tube near the poles. The tube was shaped like a gridiron and was about 8 inches square. As it drew near the electric arc of the oscillator it began to glow, and when it was close by it was all ablaze with a pure light.

"If it were night," Mr. Tesla said, "this light would diffuse itself over this whole room so you could read anywhere, although the candle power of the light is low."

His lights would be supplied by wires running across each room, but they could be produced without any connection with the wires if desired. Another form of tube, he said, gave a light many times more brilliant than the arc electric light, and this was suitable for such things as searchlights.

### A New Paste.

PROF. ALEX. WINCHELE is credited with the invention of a cement that will stick to anything. Take 2 ounces clear gum arabic,  $1\frac{1}{2}$  ounces fine starch, and  $\frac{1}{2}$  ounce white sugar. Pulverize the gum arabic, and dissolve it in as much water as a laundress would use for the quantity of starch indicated. Dissolve the starch and sugar in the gum solution. Then boil the mixture in a vessel suspended in boiling water, until the starch becomes clear. The cement should be as thick as tar, and should be kept so. It can be kept from spoiling by dropping a lump of camphor, or a little oil of cloves, or sassafras. This cement is very strong, indeed, and will stick perfectly to glazed surfaces, and is good to repair broken rocks, minerals or fossils. The addition of a small amount of sulphate of aluminum will increase the effectiveness, besides helping to prevent decomposition.

—The *Moniteur de la Bijouterie*, etc., says that 1,200,000 watches are annually manufactured in the United States, which require 12,000,000 precious stones, or from 7 to 21 for each watch.

## The Lightophone, an Instrument Recording Sound Waves.

THE operation of photographing sound waves and from the plate reproducing the original sounds has been, says the New York *Herald*, successfully carried out by the Rev. A. C. Ferguson, a Baptist minister of Brooklyn. When a *Herald* reporter called upon Mr. Ferguson he explained his methods in detail.

The astonishing part of his discovery, he says, is the simplicity of the process by which this marvelous result has been achieved. There is no ponderous or complicated machinery. Only two disks, each about 7 inches in diameter, revolved by ordinary cranks. One of these, the recorder, is horizontal; the second, the reproducer, is revolved perpendicularly. The recorder is operated by a horizontal axle and crank running parallel to and beneath the disk. A small grooved pulley on the further end of this shaft, by means of a round rubber band, conveys motion to the perpendicular shaft of the disk by passing over a roller, thus changing its perpendicular into horizontal motion and revolving a grooved pulley on the shaft placed beneath the disk.

Upon the upper side or face of this disk a sensitized circular glass plate is clamped. On a level with it on one side is placed a very sensitive diaphragm, somewhat like that of a telephone. This operates a vibrating shutter placed in the bottom of a light tube. The plate recorder and diaphragm are inclosed in a shield, which covers them completely, and excludes all light except what comes from the light tube, which runs from above the top of the shield to near the surface of the plate—the whole apparatus being, of course, operated in a dark room. The shutter excludes the light from the plate until the operator begins to speak into the diaphragm, when the little shutter begins to vibrate with marvelous rapidity. The light is supplied from an electric lamp above the tube. As the beam of light strikes the plate, which is being revolved by the operator as he speaks, a series of curves are photographed on it.

Impressions, or exposures, are made at the rate of more than 2,000 per second. Mr. Ferguson says that no camera or kinoscope has yet been made to give more than 400 exposures per second. The revolving disk is fitted with a screw arrangement by which it moves from the outer edge to the centre with each revolution, and the result is a continuous fine line of curves. The plate is there taken from the records and the photograph fixed by the ordinary method. There is no camera used in the ordinary sense, but there is an arrangement of glasses in the light tube which is the secret of the inventor. The plate is of the most sensitive kind made, and the shutter is of the most delicate construction and will admit any degree of light required. The light tube is perpendicular to and above the recording disk and plate.

Next comes the work of transferring this record from the photographic plate. A photo etching is made on a line plate and bitten in by acids. From this plate disks of celluloid or vulcanized rubber are reproduced in any desired quantity. One of these is clamped on the perpendicular or reproducing disk. A needle attached to a diaphragm is dropped in the lines of curves and the handle is turned. Attached to this diaphragm is a horn similar to that of a gramophone, and the sounds spoken into the recording instrument are similarly reproduced. They are not so loud as those of the gramophone, but they are quite distinct.

The above constitutes the whole apparatus. Strangely enough, a lead pencil or a stylographic pen placed inside the horn and the point dropped in the lines of the record gives out a series of faint sounds. Speaking of his invention Mr. Ferguson said:

"About six years ago it struck me that it would be possible to photograph sound by manipulating a ray of light and reproducing the sounds recorded by such manipulation upon a sensitized plate. You see the result before you. The 'lightophone,' as I call this instrument, I have secured by patent both here and in England. I am now working on a machine to not only record sound, but to reproduce it in typewriting, and I am confident that I can do so. The lightophone is wholly my own invention, produced without any outside assistance whatever. Many scientific men here and in Europe have written to me about it, and in this city Professors Peckham and Seldner of the Adelphi College have seen it and have pronounced it an invention of marvelous interest and possibilities. There are now but two talking machines—the gramophone and the phonograph or graphophone—which will reproduce tone. The former is the invention of Berliner, the latter being the production of Edison. In both of these the sound is recorded by a needle, or stylus, upon wax. This requires pressure, as a result friction, which of necessity produces a distortion. The lightophone records upon a flat surface, and as there is no mechanical device, needle or stylus used, there can be no distortion. Light produces no pressure or friction and cannot produce distortion. In the phonograph the wave lines are perpendicular to the surface upon which they are recorded; in the lightophone they are parallel to the surface of the glass plate on which they are produced. The horizontal line best affords the conditions necessary in tone study. It is possible with these photographs to throw upon a large screen pictures of the sound waves produced by speaking, singing, instrumental music, or any other sound whatever. The possibility of using this instrument in laboratory work is very great for comparing wave sounds, inflections, modulations, crescendos, and so on of the human voice. I am now constructing a diaphragm that will record perhaps even a whisper. There is no electricity employed in the production or recording of tones in the lightophone. The sounds are produced by vibration, or more properly by pulsation."

—Sales were made recently at New Bedford, Mass., of about 22,000 pounds of Arctic whalebone for export at private terms. The stock of Arctic whalebone at New Bedford was estimated at 39,000 pounds.



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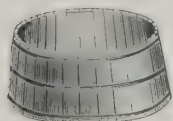
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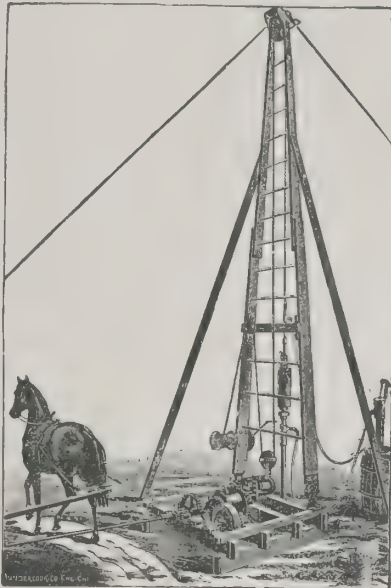
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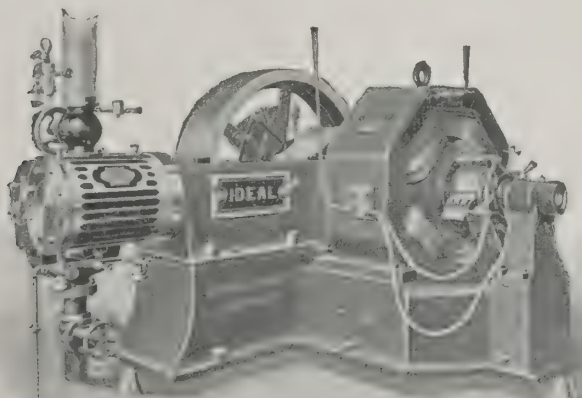
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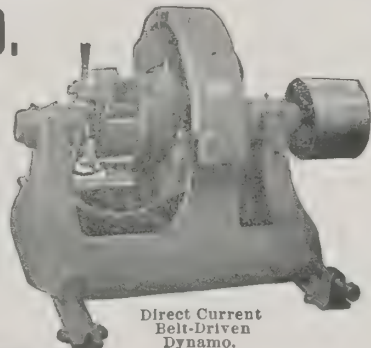
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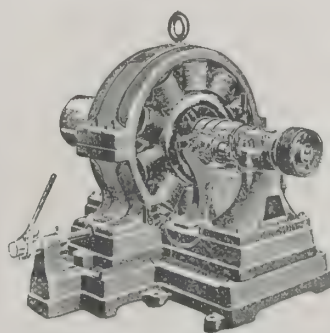
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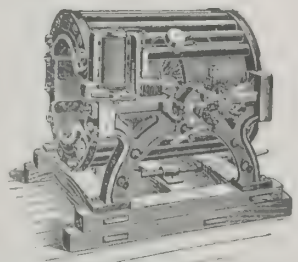
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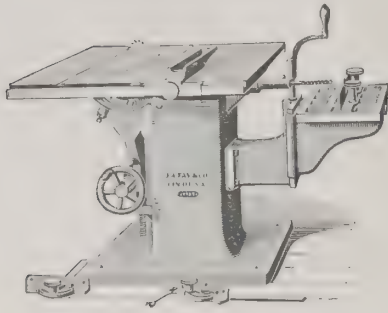
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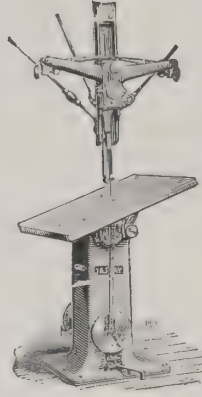
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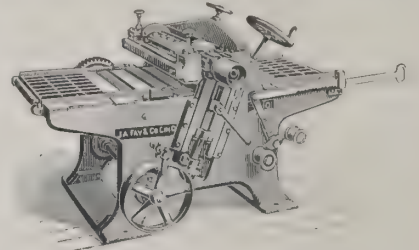
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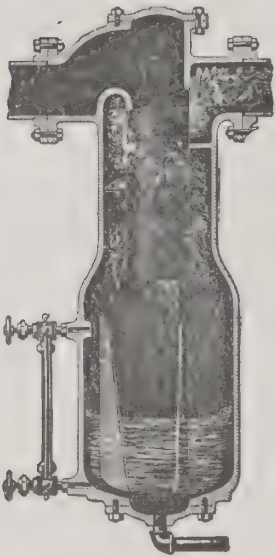


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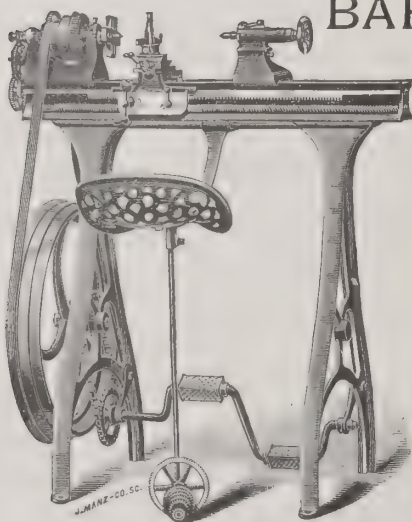
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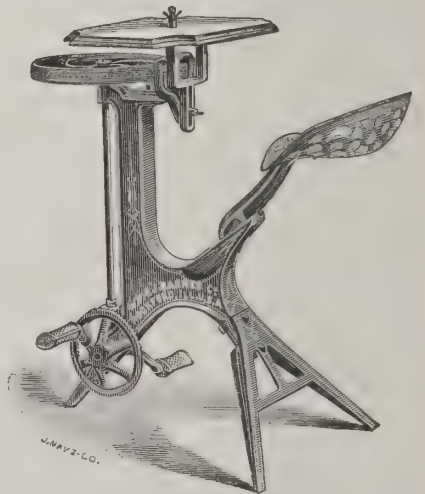
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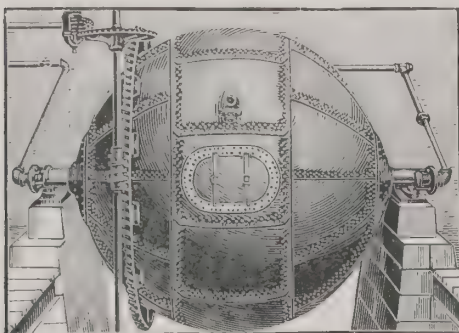
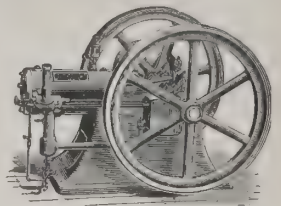
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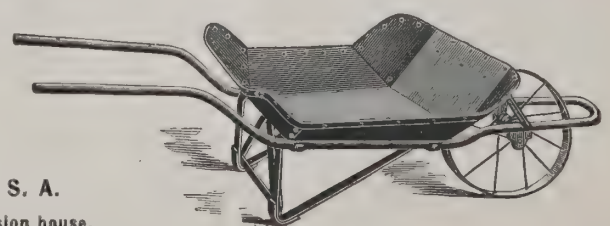
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### Why Certain American Machines Are Preferred in England.

A RECENT number of the *British Iron and Coal Trades Review* contains an article on American manufactured goods, paying particular attention to those which are exported to England or come into competition with English goods in foreign markets. The most important item, according to the *Review*, in the list of American manufactured exports for a number of years past has been locomotive engines. The locomotive industry has assumed such large proportions in the United States that the home requirements, vast as they are, are totally insufficient to keep it employed. The number of locomotives exported from the United States has increased from year to year until it is now between five and six times what it was six years ago. In other words, during that period the number of locomotives exported has increased from about fifty per annum to over three hundred. American locomotives are now annually exported to Russia, China, Japan, South and Central America, Canada, the British Australasian Colonies, Cuba and other countries.

Cheapness combined with good work is, of course, the factor that gives the American product its popularity. In reviewing the items that go to make up the cost of the construction of a locomotive the *Review* finds that labor is the principal, and that labor is not certainly comparatively cheap in the United States. One reason for the cheapness of the American locomotive it decides, is the fact that while the English firms build a hundred different types to suit their customers the American locomotive builder sticks to particular types, which render duplication easy and inexpensive. Again, the market in America is larger and steadier than the British, so that the American manufacturer is more steadily employed. This counts for much in reducing the heavy item of standing charges. The difference between one establishment working full time and another establishment working only half or three-quarters time is all the difference between making a profit and incurring a loss at a given schedule of prices. A further manifest advantage is gained by the American system of manufacturing on a large scale. Some of the American locomotive works, such, for example, as the Baldwin and the Schenectady, are, in point of size, far ahead of any in Europe.

While refusing to state whether the American or the British locomotive is the best, the *Review* concludes that there must be in all foreign countries those who are disposed to prefer American types or those types would not have made such headway. One of these American works alone has produced from first to last upwards of 16,000 locomotives and is represented in most of the civilized countries of the world.

In the matter of machine tools the Americans have gone ahead at an extraordinary pace, exporting now four times the volume and value of what they did ten years ago. During the last two years in particular this branch of American export business has greatly advanced. This increase is largely to be attributed to the growth of the cycle industry in Europe, the American machine tools being imported for that class of work especially, although they are making headway in other directions. In one case fifty automatic screw machines were ordered from the Cleveland Machine Screw Company in one lot, and to go into a single plant, and whereas in former years the trade consisted mostly of orders for single machines, or at most a very few machines in any one shop, it now often takes the form of complete equipments for the production of a certain machine or article. In discussing the reason of the great popularity of American machine tools the *Review* says: "We are apt to consider that in a new country things are inclined to be haphazard and makeshift, but we must not forget that the engineering history of New England extends almost as far back as that of Old England."

On the other hand, according to Mr. Charles Churchill, one of the largest importers in England of American machine tools, there are but few makers in England turning out machine tools on American models. This, says the *Review*, may be partly due to the fact that the American tools are so cheap that it would not pay English firms to compete with them. The same is the case with the American style lathe chuck. Mr. Churchill has been importing these goods for thirty years and has found that they meet with ready sale, yet he does not know of a single English firm which is making lathe chucks on the American pattern. American steel balls are also making headway in this country, orders for them amounting to \$20,000,000 having been placed in 1896. Other American products that have met with a very favorable reception are the gas furnaces of the American Gas Furnace Company and the automatic screw machines of the

Cleveland Machine Screw Company, 200 of which were installed in Great Britain last year.

So far as the miscellaneous exports of iron and steel products are concerned the statistics of the ten years ending 1895 show a remarkable advance, as set out in the table that follows:

EXPORT OF LEADING DESCRIPTIONS OF AMERICAN MANUFACTURES IN IRON AND STEEL, 1886 TO 1896.

Year.	Steel plates and sheets. 1=1,000 lb.	Steel rails. 1=1,000 tons.	Wire. 1=1,000 lb.	Bar iron. 1=1,000 lb.	Steel ingots, etc. 1=1,000 lb.
1886.....	9	4	8,036	1,519	272
1887.....	564	2	9,612	2,131	134
1888.....	119	5	12,734	1,508	207
1889.....	57	7	16,420	1,549	506
1890.....	484	9	21,529	2,087	269
1891.....	145	16	25,000	2,400	597
1892.....	243	8	26,059	2,854	966
1893.....	654	15	42,798	2,768	664
1894.....	1,305	16	44,778	6,681	1,145
1895.....	2,119	10	61,093	7,801	6,975

Besides the above the United States export quantities of pig iron, band, hoop and scroll iron, castings, car wheels, nails and spikes, saws and tools, stationary engines and boilers and stoves and ranges. The unenumerated exports of iron and steel have increased from a value of \$2,250,000 in 1885 to nearly \$7,750,000 in 1895. During 1896 still more notable progress has been made, and, says the *Review*, we are almost afraid to face the figures for the year 1897, which, as those published in the *Review* have already shown, has been making industrial history for the United States at a very rapid rate.

### Tin Mill Machinery for Japan.

AS the result of a recent visit to Pittsburgh, Pa., for the inspection of various industrial and mechanical plants, Mr. Nacayama Naty, of Tokio, Japan, has in contemplation the purchase of material ranging in value from \$300,000 to \$400,000.

The most important of the prospective contracts is for the erection of a tin-plate mill in the neighborhood of Tokio at a cost of perhaps \$150,000 to \$200,000. The construction of the plant will be undertaken by American mechanical engineers and master builders.

Mr. Kohn, of New York, who accompanies Mr. Naty, and who is the direct representative of the Japanese capitalist, said that the plans the latter has made involve a steady demand for American-made machinery and appliances. Mr. Naty has visited Boston, New York and Philadelphia, and in each of these cities he has partially closed important contracts, they only awaiting the approbation of his partner. The firm, besides being expectant manufacturers, also contemplate importing locomotive engines from Philadelphia, and it is very probable the enterprising Japs have secured the agency for the Baldwin Locomotive Works.

The general scheme of the firm is to manufacture and import. Naty and his partner are supposed to have much capital in their business, and although Mr. Kohn was extremely guarded in all his statements, it is surmised that they intend either building a railroad or else carrying on an extensive jobbing business in structural iron materials, billets, steel rails and many other steel products, as these articles enter into the contemplated purchases.

Mr. Kohn believes that once started the business between American manufacturers and the Japanese merchants will amount to many hundred thousand dollars annually.

WAS RATHER GUARDED.

He declined to announce just what Pittsburg corporations were the beneficiaries of the prospective contracts, but intimated that the Carnegie Steel Company would supply steel rails, and Schoenberger & Co. and the Oliver Iron and Steel Company billets and structural materials. What manufacturers may supply the machinery and equipments for the tin plate mill he was not at liberty to state for the present.

—A correspondent of the *Chicago Journal of Commerce* writes from Yokohama: "There is a considerable quantity of American hardware arriving; and, from what shopkeepers say, every year there is more call for American specialties. Take saws, hatchets, hammers and other tools, they are to-day selling as well or better than the same articles of European manufacture."



### American Steel Balls.

THE making of steel balls has come to be a very important industry in the United States, not only for domestic but foreign consumption. In another part of this issue it is stated that an American firm booked a single order for 2,000,000 for export to England recently, while large German orders are constantly being placed in the United States. Of course the principal one for steel balls is in the bicycle industry, but their application has recently been extended to ore trucks. At first sight it would appear impossible to use profitably under conditions of heavy loading, bad tracks, dirt and rough usage, a type of bearing which is usually associated with delicate and finished machines; but on investigation the objections disappear and it is found that by their aid a man can handle loads three or four times as great as without them. For, as the size of such bearings is increased, their strength under a steady load increases more rapidly, and their ability to stand shocks yet more rapidly. Theoretically, if the dimensions in all parts are doubled the safe dead load is increased four times, but at the same time it is rendered possible, under this increased load, to stand inequalities of the road twice as great. As the size of the balls is increased the effect of grit and wear, to an amount which in small ball bearings would be intolerable, becomes of very little importance. The actual amount of the wear would be less, owing to the reduction of the friction by using the balls. So that the question narrows down to this only, would the advantages gained warrant the additional first expense? With them the same power can either handle larger trucks or more at once. In the case of light ores, as quartz, when the distance trucked is small, this may not be of very much importance. Where only small quantities are dealt with, an increase in the size of trucks may be undesirable, implying, as it would, larger shafts and more engine power. But in the case of heavier ores, or such minerals as coal, where large and rapid output necessitates wider shafts and main roads, and even with quartz, if it has to be trucked a long distance, there would certainly appear to be great scope for their satisfactory employment.

Balls of any size are now produced at a very low cost. For, though their manufacture requires a large capital and extremely elaborate and well-contrived machinery as well as great skill and care on the part of the workmen, yet the large demand for American steel balls renders the industry reasonably profitable.

### Modern Wood-Carving Machines.

WITHIN the last few years a revolution has been wrought in the manufacture of furniture and the interior woodwork of houses. In the days when all carving was done by hand carved ornamental furniture, for instance, was a luxury for the wealthy; the poor, and even those in moderate circumstances, had to content themselves with furniture devoid of any such ornamentation. When carving machines were first put upon the market the conditions of the furniture industry were completely changed. Cheap and medium priced furniture was no longer necessarily plain and forbidding; it could be adorned with beautiful designs in leaves and flowers; it could be decorated with the most delicate tracery and the most graceful scrolls and yet be within the compass of those with very moderate means. With the advent of these machines it was thought that the question of producing cheap carvings had been solved once and forever, but the ingenious and inventive American artisan is never satisfied, consequently "improvement is the order of the age."

The people, too, have learned to appreciate and desire what is beautiful, and a great and increasing demand has arisen for ornamental furniture, to meet which carving machines have been perfected to such an extent that there is scarcely any design that cannot now be reproduced at a cost that would have seemed impossible a few years ago. Nowadays every one who owns furniture at all owns furniture which is more or less ornamental, and practically all of it is machine made.

Owing to the fact that at present showy furniture has the preference a carving machine to be a success must be able to produce a great variety and quantity of work at a low cost. Illustrations of what can be accomplished by a modern carving machine may be found in an advertisement of carving machines on page 5 of this paper. It will be noticed that all the lines are clear cut and as perfect as anything that can be produced by any means.

The demand for ornamental furniture in America happens to be peculiarly large. A proportionately keen competition among the American makers of carving machines naturally follows, with the result that their products are universally recognized as the best.

### Iron and Steel Figures.

JAMES M. SWANK, general manager of the American Iron and Steel Association, has issued his annual report for 1896. The report contains complete statistics of the iron and steel industries of the United States for 1896, and a review of their present condition; also statistics of the iron and steel industries of foreign countries in past years. In 1896 the United States made 8,623,127 tons of pig iron, 3,919,096 tons of Bessemer steel ingots, 1,298,700 tons of open hearth steel, and 5,281,689 tons of steel of all kinds, and rolled in all 5,515,841 tons of finished iron and steel, including rails; there were also shipped in the same year 9,916,035 gross tons of Lake Superior iron ore and 5,411,602 net tons of Connellsville coke. These figures show material decreases, as compared with the corresponding items of production in 1895. The foreign value of all the iron and steel manufactures imported into the United States in 1896 was \$19,506,587, a decrease of \$6,265,549. The exports of iron and steel from the United States for the same period amounted to \$48,760,212, an increase of \$13,598,655.

### New Paper-Making Machine.

THE greater part of the paper now used is made from wood, and as the pulp used alone would make a sheet having too rough a surface for anything but very cheap grades, it is necessary to use some material as a filler to produce a smooth face for printing or writing upon. There are several substances utilized for this purpose, but the best material is sulphate of lime, because of its color, opacity and light specific gravity, which gives a finish to both sides of the sheet, while heavier materials will gravitate to one side more than the other. Plaster paris is sulphate of lime, but owing to its disposition to solidify, it has been impossible to make any practical use of it in the making of paper, although many thousands of dollars have been expended in the attempt.

For several years past Mr. Charles S. Wheelwright, of Providence, has been working on the problem of how to handle this substance, and after many discouraging and futile efforts, finally succeeded in producing an apparatus whose adaptability to the purpose, constant use in several of the best mills for three years past has demonstrated. With this apparatus it is possible to crystallize the sulphate so that it can be handled as desired by the paper maker, and thus make available the best material at a largely reduced cost.

The machine is very simple in detail, consisting of a tank and pump as the principal parts, the arrangement of them, which is patented, constituting the essential element. The apparatus consists of a conical tank and a centrifugal pump connected with the bottom of the tank by a suction pipe, and with the top by a return pipe entering the tank at one side at a tangent to its periphery. The liquid leaving the tank thus revolves in the same direction as the mixture in the tank, circling and falling under the force of the friction pump. The return pipe has a three-way valve to shut off the flow to the tank, and open a discharge pipe. At the top of the tank is a revolving sieve, through which the material to be mixed with the liquid is fed to the tank.

When the pump is started the liquid in the tank is given a rapid spiral motion in which it is aided rather than retarded by the inflow of the returning liquid; the conical form of the tank prevents the lagging of any part, and the settling of the solid particles of the mixture.

### What Invention Has Done.

WHAT is it that enables an operative to-day to produce so much more in a less number of hours than he could thirty or forty years ago? It is simply invention, as embodied in the improved machines, tools, processes and appliances that American inventors are constantly furnishing to American manufacturers.

Near Baltimore there was recently erected one of the largest plants for the manufacture of Bessemer steel in all its forms in the world, and, as recently stated by its superintendent, by means of the inventions and improved appliances they have adopted they are enabled to produce a ton of steel with but one third of the manual labor required at their other establishment built twenty or twenty-five years before.

In 1866 steel rails cost \$165 per ton. In 1884 they had dropped to \$34, in 1893 they were \$21 to \$24 per ton, and in 1897 even less. See how that has expedited the building of railroads, which now cover the country like a network, and without which modern enterprise could not be carried on. And the same is true of steel in all its forms, so that to-day we build steel bridges, steel vessels, steel cannon, steel frames for our buildings and for farm implements, and use steel nails.

Inventions and improvements have so reduced the cost of steel rails that already, during the year 1897, the United States have sold 100,000 tons to Europe. They sold 100,000 tons of pig iron from the Southern States in 1896, and this year it is estimated that it will be 250,000 tons, where before the war none was produced. In 1896 the American export of iron and steel, manufactured and unmanufactured, amounted to over \$41,000,000.

As an illustration of the benefits of invention, take the common nail. In 1818, when they began to be made by a machine operated by hand in Pennsylvania, they cost from 18 to 37½ cents per pound, according to size. Now they are sold at 1 to 1½ cents per pound—so cheaply, indeed, that a carpenter, working for 30 cents per hour, had better let a nail go than to spend ten seconds to pick it up, for ten seconds of his time is worth more than the nail.—*Engineering Magazine.*

### To Build Bridges in Japan.

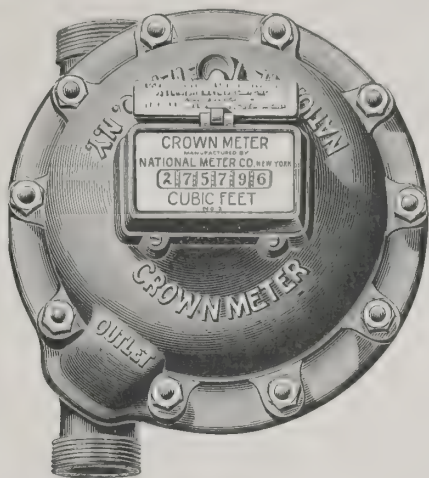
J. A. L. WADDELL, a civil engineer, of Kansas City, Mo., U. S. A., is working on plans for the construction of a series of seven bridges across the Agano River, in Central Japan, for the Nippoo Titsudo Kivaisha, or Japan River Company, which is building a railroad through the mountains there. The bridge superstructures alone will cost over three-quarter million dollars in United States money. They will be on the plan of the cantilever framework and after the plan of, but smaller than, the bridge across the Colorado River near The Needles, Cal., which is 660 feet long. All the material for the bridges will be shipped from this country, and will amount to over 400,000 American tons. The spans will vary in length from 300 to 500 feet, and will be of great height and strength, as the mountain torrents rise at times as much as twenty-five feet in three hours and tear through the gorges at terrific rates.

—A 12 spindle automatic drilling machine for drilling the brass stems of pneumatic tire valves was shipped recently to European parties for whom it was specially designed and constructed by a Providence firm.



Interesting Information for Water Works Officials about

# WATER

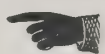


# METERS

They measure correctly the amount of water passing through a pipe.

They increase the revenue,  
Restrict the waste,

and assist in maintaining a uniform pressure in the water main.



We have many letters of similar character, copies of which we would be pleased to mail you.

## NATIONAL METER CO.

298 BROADWAY, NEW YORK.

The Largest Water Meter Manufacturers in the World.  
Over 181,000 in Service.

[JULY, 1897]

City of Highland Park, Illinois.

NATIONAL METER CO.,  
298 Broadway, New York.

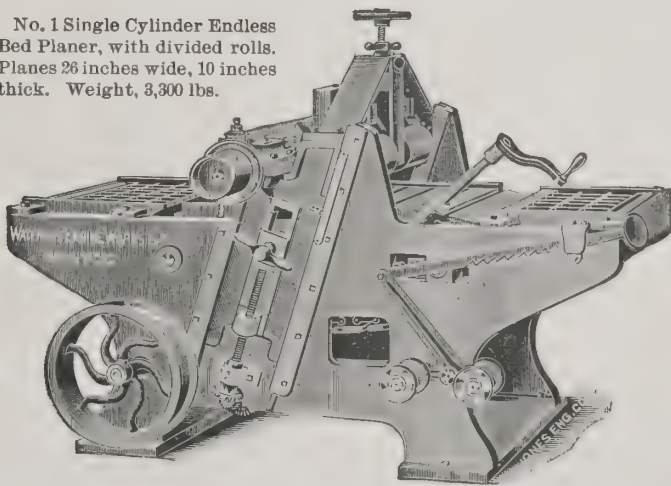
GENTLEMEN:

Replying to your favor of the 8d inst., would say that the city of Highland Park adopted the meter system in their water works in the winter of 1894-95. The result has been a material increase in revenue from the system, and a decrease in pumpage of at least 40 per cent. The water takers are well pleased with the service, as each pays for what he actually consumes. The city derives another advantage from the fact that leakage is quickly discovered, thereby increasing the economy of operating the system. Our experience has fully satisfied the most skeptical that meters soon pay for themselves in increased revenues on the one hand, and reduced cost of operating on the other.

Yours very truly,

J. C. CUSHMAN,  
Chairman of Water Committee.

No. 1 Single Cylinder Endless Bed Planer, with divided rolls. Planes 26 inches wide, 10 inches thick. Weight, 3,300 lbs.

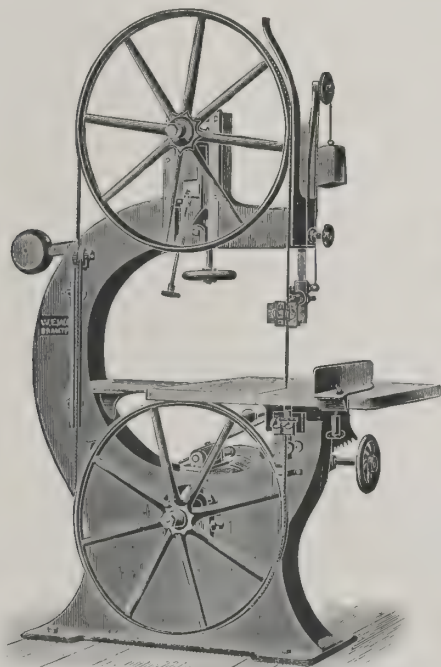


## Wood-Working MACHINERY.

No. 1 E. B. Planer. Weight, 3,300 lbs.; like cut.  
No. 1 Double Cylinder E. B. Planer. Weight, 5,300 lbs.  
No. 2 E. B. Planer. Weight, 2,600 lbs.  
"Champion" Combined Planer, Matcher and Moulder.  
Planes 24 inches wide up to 6 inches thick. Best all-around machine.

MANY OTHER STYLES AND SIZES,  
AND FULL LINE OF  
WOOD-WORKING MACHINES.

Long experience in the export trade is  
a satisfactory guarantee.



No. 3.—36-inch Wheel. Weight, 2,000 lbs.

## BAND RE-SAWS.

No. 5 Band Resaw.—48-inch wheels; saws 24 inches wide, 5 to 40 feet per minute. Resaw swings clear of machine when required. Weight, 4,500 lbs.

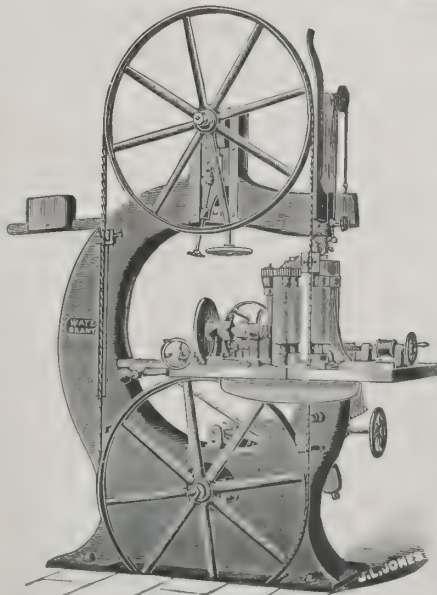
No. 6 Band Resaw.—48-inch wheels; takes saws to 3 inches; cuts 30 inches deep. Weight, 4,300 lbs.

No. 7 Band Resaw.—54-inch wheels; 4-inch saws; cuts 30 inches deep and to center of 10 inches. Weight, 5,300 lbs.

OTHER SIZES MANUFACTURED.

FULL LINE OF

Saw Mill Machinery.



No. 4.—40-inch Wheels and Removable Resaw. Weight 2,750 lbs.



1844.

NEW  
PREMISES.

1896.

January, 1896, we moved into new premises, securing unsurpassed facilities for executing contracts promptly and satisfactorily.

Order direct or through your commission house, sending us copy of order.

Saw Mill Machinery Our Specialty.

There are some 300 of our saw mills running in South and Central America, Europe, Asia and Africa, of different sizes, from those cutting logs 6 feet in diameter to small mills sufficiently portable for mule-back transport.

# WATEROUS,

BRANTFORD,  
CANADA.



### Another Air Ship.

WHEN Charles H. Lamson of Portland, Me., succeeded in taking a flight through the air on a kite of his own devising at Falmouth recently, his friends made up their minds that he was well on the way toward solving the problem of aerial navigation. Mr. Lamson has an idea of the same kind himself.

"I have been interested in the subject of aerial navigation for some years," he said to a *Sun* correspondent, "and have made several forms of airship kites, two or three of them large enough to carry up a man in a 20 mile wind. I corresponded with the much lamented Otto Lillienthal in 1895, and believe I was the first one in this country to make and test one of his flying machines. This was made from plans drawn by Herr Lillienthal himself. It was tried on Diamond Island, in Portland harbor, and, although its supporting power was fully sufficient to carry the weight of a man, yet its stability in the air was so deficient that it seemed to me to require a great amount of practice in order to soar any distance, and it seemed too dangerous to be considered a successful type. It must be admitted that Lillienthal did well with it in frequently soaring about 300 yards from the starting point. My work since that time has been an effort to find some form of supporting surfaces that could be so regulated as to be safe and stable when in flight. Others are also working in this line in a more scientific way than I, perhaps, among them Prof. Langley, O. Chanute, and A. M. Herring. Since Maxim and Langley have demonstrated that it is possible to build and fly, kite like, aero-dromes using steam power, the great public have been obliged to admit the likelihood of the early accomplishment of the flying machine. These two inventors have devoted their principal efforts to perfecting the light motors and propellers. Chanute and Herring and, in a modest way, I, have been devoting more attention to the form of the supporting surfaces, which are as important as the motors, and, indeed, some of us believe that it will eventually be possible to sail the air and go in any direction upon rigid wings without the motor, as the birds of the South fly. There would then be two types of airship, the motor driven aero-drome, and the sailing airship.

"In my search for stability I have been led to construct a number of different forms of kites, some of which have been previously noted. The forerunner of modern scientific aerial navigation was first given to the public by Herring in his cellular or box kites. My airship kite, used at Rigby Park last year (when my experiments, first described in *The Sun*, had received national attention), was a modification of that form with an effort to introduce steering into the wind by using jointed cells or levers. This kite proved to us that it was necessary to have this large surface so that it could be readily folded for transportation. With this in view the kite recently flown at Falmouth Fireside was constructed. It having been found that slight changes in the position of the weight carried were sufficient for steering, no rudder was attached to this last ship. We are by no means certain that we have yet arrived at the proper form of aero-planes or curves. In fact, we feel quite certain that we are some distance from it, although these kites have demonstrated that they are comparatively safe and stable while in the air. I may be pardoned for saying that this comparative safety to the navigator is a great point gained. The immense danger to human life in attempts at aerial navigation has been a tremendous drawback to scientific experimenting heretofore. With danger to life and limb reduced to a minimum, we certainly shall find scientific experimenting much more easy of accomplishment in the future. The fact that a scientist can now, with almost absolute safety, make his observations and calculations an experiment in actual practice while sailing in midair is the biggest advance yet made along the lines of aerial navigation.

"The best practice seems to show that the principal supporting surfaces of air ships should be near the front, and that the following surfaces should be lightened and simply used to keep the main or supporting surfaces at the proper angle to the wind. One of the most disheartening difficulties that I have found in these large kites is their liability to injury when on the ground and in starting or alighting. Unless they go up on an even keel one side may catch in the ground with destructive effect. So, too, alighting they must land on an even keel. Inasmuch as close to the ground the currents of air swerve around in different directions, constant attention is necessary to make a fair start and landing. I have found it a great advantage to have the airship run on wheels, and so have used pneumatic-tired bicycle wheels in my late experiments, and have found them just the thing needed for the trick. A light small wheel or castor of this sort on the tip of each wing might prevent serious injury to machines, as it is necessary to make them light and strong. The larger the kites the more difficult it is to make them light and strong. Although our large kite weighed less than three ounces to the square foot of sustaining surface, yet it would easily sustain a man when suspended from either two of the outer ribs, a distance of twenty feet, and as in the air it was evenly supported over the whole surface, it was deemed amply strong.

"I took pains to have each vertical strain supported by three piano wires, each capable of lifting 300 pounds. On our first trial, a year ago, we found the vertical struts separating the two surfaces were not quite sufficient to stand the strain, and they were replaced by stronger ones. Weakness in these points caused, you remember last year, at Rigby an accident and fall of 1,000 feet. A dummy was on board, but a man would not have been hurt, for the fall was as gentle as a dove's lighting on the ground.

"The anchorage, invented by myself, was suggested by Mr. Woglom's plan of handling a tandem string of his Malay kites. That is the nautical method, using snatch and cleat."

"What kind of rope do you use in your work?" *The Sun* correspondent asked.

"The day of rope has passed with me as far as these advance experiments

are concerned," said Mr. Lamson. "I use piano wire, such as is used at Blue Hill. The limit to the height of the flight of an airship is the weight and wind pressure against the string. The strongest material and the lightest weight per mile is found in piano wire, and therefore the highest flights have been obtained by its use. In our preliminary flights we had to use rope; but the days of rope in scientific kite flying are over.—*N. Y. Sun*.

### American Laundry Machinery in England.

AT a recent meeting of the Laundrymen's National Association of England, James Armstrong, London manager of the Troy Laundry Machine Company, delivered an address on the subject of "American Laundry Machinery and Methods." Mr. Armstrong said that modern laundry machinery was practically an American creation and that now its use is almost universal among British laundrymen.

The backbone of all laundry work, he said, was the washing machine. Every British manufacturer of laundry machinery more or less copied the American rotary and made it his staple line in washing machines. Another machine of great importance to the laundryman is the hydro extractor. The American peg-top or self-balancing hydro-extractors, he said, are now largely in use in England. The great advantages of these machines are their lightness and smallness. Furthermore, they take but little power to work them and require no foundation such as is necessary with the heavier machines. Mr. Armstrong said that their machines could be bolted to the ordinary wood floor in the tenth story of a building—he had seen them in New York on the seventeenth—and could be worked even at that elevation without communicating any vibration to the walls or floor of the structure.

Other American laundry machines which have been extensively adopted in England are the shirt front or bosom ironer of the reciprocating-table type and the American steam mangle.

The principal reason, said Mr. Armstrong, for the excellence of the American laundry machinery is that owing to the high cost of labor in America the American laundryman employs a very large amount of labor-saving machinery.

### The Adaptability of the American Machinist.

IF there is any one branch of work in which the American machinist excels more than in another it is in the building of special machinery, by which is meant machines not kept in stock or regularly manufactured, but specially devised and made for special uses.

For instance, man designs some article of use which he works up by hand, or by the aid of machinery. To produce this article in quantities at such a cost that it can be sold at a profit special machinery is required. The designer or inventor takes the article to the builder of machines and says: "Can you make a machine that will make these things, and will you guarantee it to work?" It is altogether probable that the machine builder answers yes to both questions, because there is practically nothing that he cannot do.

Special machinery is built for a wide variety of uses. As the knowledge of American skill in this direction, now long familiar, has spread, orders have come from all over the world, and special machinery is sent from here also for use in enterprises installed and conducted by Americans in foreign countries.

Such machinery, for various uses, is shipped from this country almost everywhere. One big machine shop in this city that is largely engaged in the production of special machinery sends probably a third of its work out of the country. It has sent machines to every land.—*N. Y. Sun*.

### German Order for American Machinery.

THE German ammunition and small-arms factory at Berlin has given an order to the Cleveland Machine Screw Company, of Cleveland, Ohio, for nearly \$120,000 worth of machines for making steel balls for bicycles. This article used to be made almost exclusively at Schweinfurt, Germany, and was exported to the United States in small quantities. The value of these exports for the last four quarters amounted to \$20,877. Previous to this the manufacturers at Schweinfurt had been considered as having a sort of monopoly, it being thought that they were the sole possessors of patents for the manufacture of such balls, and it came in the nature of a surprise when it was found that not only were they being manufactured in the United States, but that we were shipping them to Germany. The phenomenal development of this steel-ball industry is shown by the fact that an English syndicate offered \$1,000,000 for a Schweinfurt factory engaged in this line of work, which was made a joint stock company twelve months ago with a capital of only \$150,000. After the first year's work was over the balance sheet showed a net profit of about \$87,000. Commercial agent Stein, located at Bamberg, says that quite a number of steel-ball factories have sprung up in his district during the last few months, one of them situated in Bamberg. Some of them have only been partially started, for the reason that it has been impossible to procure the necessary machinery, since the German works are engaged for many months ahead.

—The material for the first steel building to be erected in Japan has been contracted for in the United States.

—A correspondent of the Sheffield, England, *Ironmonger* says that in supplying the gold miners of South Africa and Australia with shovels the Americans have almost a monopoly. He also states that American heavy mining machinery is very largely used in the same districts.





Absolutely noiseless,  
Immediate and strong siphonic action,  
With a cistern valve that can be regulated  
for any discharge,  
Every part constructed of best known materials and workmanship

DESCRIBES THE

## MAELSTROM

Water Closet,

which represents the greatest improvement  
in sanitary appliances, made by

## OWEN & SALTER

MANUFACTURERS OF

**Plumbing Materials,  
Lavatories, Baths  
and Water Closets,**

12TH AND BUTTOWOOD STREETS

PHILADELPHIA, PA., U. S. A.

Send for illustrated catalogue.

## JAMES H. TARR,

MANUFACTURER OF

"Yacht Composition"

AND

"Green Racing  
Composition"

for wooden bottoms.

"Marine Iron" Paint

for the bottoms of  
iron or steel vessels.

Tarr's Celebrated

## Copper Paint

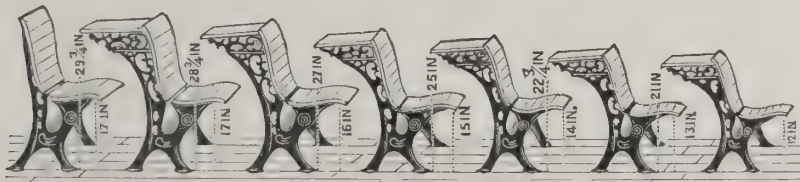
These Paints are acknowledged the best manufactured for their respective uses.

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TESTIMONIALS FROM PARTIES WHO  
HAVE USED THEM.

Factory and Office, GLOUCESTER, Mass., U. S. A.

NEW YORK OFFICE, 41 WATER STREET.

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### SCHOOL DESKS

Sizes for pupils from 5 to 20 years  
of age. Price \$2 per desk upwards.



**THEATRE AND  
HALL ...  
SEATING**

◆ 100 Styles at \$1.00  
◆ each and upwards.

Goods in every civilized country  
of the Globe.



**CHURCH  
FURNITURE**

OF  
ALL KINDS

Seating at 50c. per  
linear foot upwards.

SEND FOR COMPLETE CATALOGUE AND PRICES.

THE LARGEST FACTORY OF THE KIND IN THE WORLD.  
OUR FURNITURE HAS MADE GRAND RAPIDS FAMOUS.

## School Furniture Co.

CABLE ADDRESS:

"IRONWOOD GRAND RAPIDS."

GRAND RAPIDS, MICH.  
U. S. A.



METALS PERFORATED AS REQUIRED FOR

## SCREENS OF ALL KINDS

FOR USE IN

Milling and Mining Machinery,  
Reduction and Concentrating Works,  
Woolen, Cotton, Paper and Pulp Mills,  
Rice, Flour and Cottonseed Oil  
Mills,  
Sugar and Malt Houses,  
Distilleries, Filter Presses,

Stone, Coal and Ore Screens,  
Stamp Battery Screens,  
Brick and Tile Works, Filters,  
Spark Arresters, Gas and Water  
Works,  
Oil, Gas and Vapor Stoves,  
Coffee Machinery, etc., etc.

STANDARD SIZES PERFORATED TIN AND BRASS ALWAYS IN STOCK

Main Office and Works: No. 218 North Union St., Chicago, Ill., U. S. A.

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## C. A. WOOLSEY PAINT AND COLOR CO.

98, 100 and 102 Hudson St.,

JERSEY CITY, N. J., U. S. A.,

MANUFACTURERS OF

Woolsey's Copper Best Paint,

Woolsey's Domestic Kalsomine,

Woolsey's Coach and Car Colors,

Woolsey's Wood Stains, Wood Filling, etc.

### Copper Best Paint

FOR THE PRESERVATION OF THE  
BOTTOMS OF WOODEN  
VESSELS.

TESTIMONIAL.

From DEVONPORT FERRY CO., L'd  
Auckland, N. Z., May 20, '91

To C. A. WOOLSEY PAINT  
AND COLOR CO.,  
Jersey City, N. J., U. S. A.

Gentlemen—I have great pleasure in recommending Woolsey's Copper Best Paint. I have used it on my Company's steamers for a number of years past, and it has given entire satisfaction. The Devonport Ferry Company's steamers "Britannia," "Victoria," "Alexandra," "Takapuna" and "Tainui" are now coated with Woolsey's Copper Paint over Metal Sheeting.

Faithfully yours,

ALEX. ALISON, Manager.

### "KALSOMINE."

Our Kalsomine is made of the best selected material and the tints and colors are particularly brilliant and clear. We are selling large quantities in the foreign markets with gratifying results. Send a sample order. You can make no mistake, for it is the best Kalsomine in the market.

### COACH

—AND—

### CAR COLORS.

GROUND IN JAPAN.

TESTIMONIAL.

CHARLOTTE, Mich.,  
March 17, 1890,

C. A. WOOLSEY,  
Dear Sir:—We have used your colors for the last two years and we like them better than any we have ever used. Your Black, Wine and Greens are very fine colors, being very finely ground and having a good strong body. Your Ruby Red, we think, is the finest Red in the market, and full as nice as Carmine.

Yours truly,  
MAY & BARNEY.

WE MANUFACTURE ALL STYLES OF



Wheelbarrows,  
Warehouse Trucks,  
Handcarts and  
Rubber-tired Wheels.

May we send you our 100-page catalogue and quote prices  
on best goods manufactured?

LANSING WHEELBARROW CO., Lansing, Mich., U. S. A.



## SMITH & POMEROY,

KALAMAZOO, Mich., U. S. A.

MANUFACTURERS OF

### "EUREKA" Windmills.

Galvanized Steel Mills, Power Mills for running machinery,  
Wood Wheel Mills, Galvanized Angle Steel Towers  
and Painted Tubular Steel Towers.

The "EUREKA" has been in constant use for 24 years,  
has stood the test in every country on the globe and is fully  
warranted. Both mills and towers fully up to the times  
whether of wood or steel.

CATALOGUE AND PRICES ON APPLICATION.



### Walks on the Water.

IT is reported that Professor William Cook, whose real name is Glover, has solved the problem of walking on the water. Professor Cook, however, refuses to reveal the secret, and all that can be discovered about his method is that he wears upon each foot what bears the appearance of a small boat of very peculiar construction, which enables him to glide over the surface of the water almost as rapidly as a skater can make his way over ice that is in good condition.

Professor Cook permits the public to see the tests of his remarkable invention and gives daily exhibitions in Columbus and Atlanta, Ga. Close inspection he avoids, however, and those who watch him are obliged to gain their ideas by long range methods and the aid of a field or opera glass. Observed with the assistance of the latter, the boat-like shoes which enable the inventor to travel about like a ship are three feet long and eight inches wide. On the sides and bottoms are fin-like projections, which close when the foot is moved forward, but open and present a large surface of resistance to the water when the other foot advances.

This is as far as the keenest observation goes. No one has been able to find out what the material is that is utilized for the shoes and the counterfeit fins. None can learn how they are manufactured, or the method by which the two are connected and operated. These facts are the secret of the inventor, who is more than reticent, and states that if any one learns the particulars of his plan, it will only be after a great deal of trouble with him personally.

Several months ago Professor Cook went to Americus on a visit, taking his water-walking apparatus with him, but he was deaf to all entreaty from various persons to permit them to gain a sight of his remarkable invention. Among the curious was his brother, but he fared no better than the rest and is as ignorant as he was at the beginning.

One who has closely observed his movements noticed that whenever Professor Cook took a step there seemed to be some peculiar agitation of his body. For this reason it is thought that there is some sort of an apparatus which is used in connection with the shoes to bring about the general effect desired. In walking the professor does not lift his shoes from the water, rather shuffling them along in the old familiar fashion known as "scuffing." At least if he does lift his feet, the action is not observable through a field glass. The general appearance of Professor Cook when he is engaged in this method of walking indicates continued and rather powerful effort.

### Fog Horns Worked by Compressed Air.

THE fogs that gather along the coast at certain periods are extremely dangerous to navigation; so much so, in fact, that a department is established by the Government for the maintenance of a thorough system of fog signalling in connection with the Lighthouse Department.

New York harbor, the Atlantic coast down to Sandy Hook and northeast as far as Rhode Island comprise what is known as the Third Lighthouse District. The Department's headquarters are at Tompkinsville, S. I. From this point the Government furnishes supplies for the lighthouses and fog signals that dot the coast between the points mentioned. Many improvements have been made during the past few years toward guarding the shipping interests in the perilous times of fog. An indispensable appliance for the safety of a fog-enveloped vessel is a fog horn or trumpet. The Department has therefore bent its efforts toward perfecting the system of fog signalling. Passing from the use of steam, which was deemed inadequate, they have adopted compressed air for making great noises during the fogs. The blast from a first-class compressed-air siren practically bores a hole through the cloud of fog and reaches vessels that are even many miles away and warns them that danger lurks there.

To run these compressed-air sirens an oil engine and an air compressor are used. A plant is now being installed at Montauk Point, L. I., comprising a 10-horse-power oil engine and an air compressor. The oil engine is best adapted for this service, because steam, the only other available power, would never be ready when wanted. Compressed air can be stored for an indefinite period, and this is a great convenience in case of a sudden fog.

The air-compressor cylinder is 10-inch diameter by 8 inch stroke, furnishing 107 cubic feet of free air per minute at 150 revolutions. The air is compressed and delivered to a receiver at 50 pounds pressure. It is then carried to another receiver about 200 feet distant. Midway on the pipe line a reducing valve regulates the pressure and admits it to the second receiver at 30 pounds pressure. Receiver No. 2 holds the immediate supply of air to operate the trumpet. Discharging through the siren at this lower pressure enables the receiver to maintain its supply for a time sufficient to get the engine and compressor in operation. There are two trumpets attached to the receiver, and they are used at once or alternately, as desired. One first-class siren is supposed to consume 12 cubic feet of free air per second. A first-class siren is automatic and blows at intervals of ten seconds. It can best be described by calling it a "good big clarinet."

THE laundry machinery manufacturers are particularly busy at the present time and their product is finding a market in all parts of the world. The demand for American steam laundry machinery in England, which was very light up to two years ago, has grown at such a rate that it now reaches enormous proportions. The first steam laundry seen in Russia has recently been installed by an American firm, which has also equipped the first steam laundry ever located in the Sandwich Islands. In addition to the shipments to England, Russia and Honolulu, there have also been recent important shipments to Johannesburg in South Africa and smaller shipments to Japan.

### Some Wise Words.

IT is a significant sign of the times that journals of various kinds make a regular feature of labor news. It is still more significant that about nine out of every ten items of intelligence under that heading will be found to relate to strikes. There are strikes in contemplation, strikes imminent, and strikes in progress, strikes for increased wages, strikes for less work, strikes against foremen that are conscientious, strikes against the dismissal of incompetent or worthless union members, strikes to limit the number of apprentices, strikes against the employment of non-union workers, strikes deliberate, strikes impulsive, scheming strikes, petty strikes and—strangest perhaps of all others—strikes against the introduction of improved machinery. How scornfully do we regard the men—the misguided and shortsighted men who drove John Heathcoat out of the Midlands, those who chased Jacquard along the quay at Lyons, those who headed the Luddite frame-breakers, or those who caused Crompton to work in fear and trembling on the machine that brought so much wealth to his county and so little remuneration to himself; and how eloquently could any of our political economists or our press writers dilate upon the benefits of more efficient machinery, and the increased employment, as well as other material gains that invariably follow it. Yet we have the prospect of some 40,000 or 50,000 engineers in various parts of the kingdom being idle for an indefinite length of time because a boring machine, which dispenses with a certain amount of labor, has been put in charge of a man who is held to be "unskilled" by the Amalgamated Society of Engineers. There appears to be no question as to the ability of the man, who is set down as unskilled, to work the boring machine, and it would seem that the great Amalgamated Society of Engineers would have no objection to one of their own competent and well paid members being set to work upon the machine. Their own purpose is to prevent employers and the trade generally reaping the benefit of this labor-saving appliance, for fear lest engineering employment should be in the least degree restricted, and all their 40,000 or 50,000 docile members must follow their leaders "Perish trade efficiency, perish trade supremacy," they say in effect, "and perish unskilled labor rather than any boring machine shall in any way or for any time impair our position."—*Irish Textile Journal*.

### A New Light-Producing Gas.

AN apparatus for producing light from a gas caused by the reaction taking place when water is added to carbide of calcium is among the recent inventions. Previous devices in this line have been characterized by the drawback that after the gas has once been generated no automatic arrangement will stop the slow generation of the gas from the carbide in the apparatus, but contrariwise, on the gas being turned off, if any quantity of the carbide be decomposed, the automatic generator, with its small holder, becomes an active danger, as it will either escape or generate dangerously high pressure. Instead, therefore, of having the carbide come into contact with the water, the latter is, in this new mechanism, brought into contact with the carbide in only sufficient quantities to give the desired result, viz.: the generation of sufficient gas to keep up a continuous flame and be at the same time under control, so that if the entire supply of water is shut off further evolution of gas is prevented. In place of the liquid, as in a kerosene lamp, a small portion of calcic carbide is placed in the bowl of the lamp, and over the bowl is a small cup containing water. A small thumbscrew, rising through the centre of the bowl, on being turned, allows the water to enter a cylinder which contains a hollow piston, the head of this reaching into the bowl, through which the water comes into contact with the calcic carbide. Gas is evolved immediately, and, acting upon the piston head, causes it to rise and prevent further egress of water until the gas in the chamber is consumed, when the piston falls, admitting a fresh supply of water, which operation continues to repeat itself.

### A Deep Boring.

THE deepest well in the world will soon be completed near Pittsburg. It is now more than one mile deep, and when finished may reach down two miles into the earth. It is being bored in the interest of science, the object being to determine just what the interior of the human footstool is like. From a commercial point of view the well was a success long ago, at comparatively few feet below the surface both gas and oil were struck in paying quantities, but the company owning the plant determined to dedicate it to science, and invited Professor William Hallock, of Columbia College, to carry on a series of temperature investigations as the hole is carried deeper and deeper into the earth. The result of these investigations are very interesting, and it is the opinion of several well known scientists that the ultimate result of the boring will prove to be of widespread economic as well as scientific value. Most significant of all the facts so far ascertained is that the well grows steadily hotter as its depth increases. The temperature of the Pittsburg well at a depth of 5,000 feet was found to be 120.9 degrees Fahrenheit. At the bottom, which is at present 5,502 feet from the surface, the temperature is 128 degrees. This gradual rise is found to exist all over the world, although it is more marked in some places than in others. In a deep well near Wheeling, West Virginia, the temperature is 51 degrees at the top and 110 degrees at the depth of 4,500 feet. In the Sprenberg salt well, near Berlin, the temperature is about 47 degrees at the top and 118 degrees at a depth of 4,170 feet. In the Schaladabach salt well, near Leipsic, the surface temperature is about 51 degrees, while at 5,740 feet it runs up to 135.5 degrees. External conditions seem in no way to affect the temperature of the wells.—*Scientific and Mining Press*.





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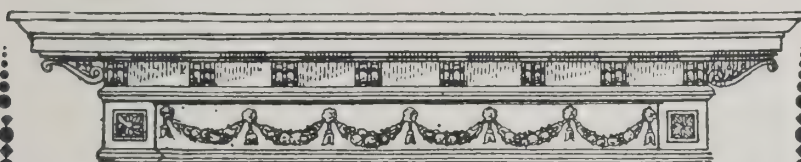
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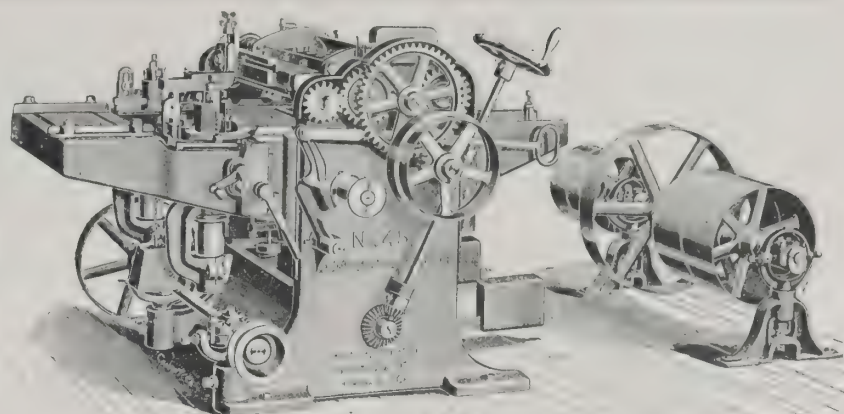
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### REMARKABLE FACT.

This cut is a copy of a photograph of a board having one end painted with New Jersey Copper Paint, manufactured by Harry Louderbough, proprietor of New Jersey Paint Works, Jersey City, N. J., U. S. A., and placed in the water at Port Royal, S. C., for five months. Upon the unpainted end you can note the ravages of the salt-water worm so destructive to wood, and also the large number of barnacles that have fastened upon it. Observe the painted end, where New Jersey Copper Paint was applied—its splendid condition.

The board here represented was placed in the water at Port Royal, S. C., by me, and left in the water five months. The painted end was as good as when it was placed in the water.

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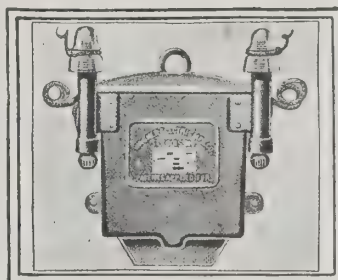
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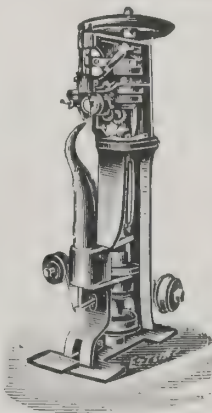
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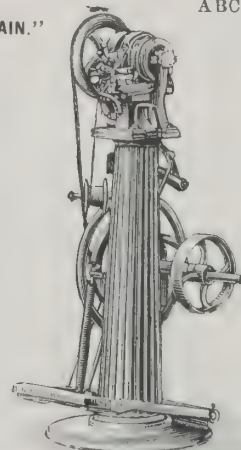
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### American Road in London.

THE proposed equipment of the Central London Underground Railway of London entirely with American machinery is a stupendous indorsement of the men and methods of this country. The construction of this extension of the underground system of the English metropolis is the greatest piece of engineering of its kind and it was decided to adopt American electrical machinery after the most thorough investigation. With the exception of the elevators the entire electrical contract has been assumed by the British Thomson Houston Company, representing in Great Britain the General Electric Company, of Schenectady, N. Y., while the elevator contract has been secured by Frank J. Sprague, of New York.

#### THROUGH THE HEART OF LONDON.

The road, laid in two deep subway tunnels, driven by the Greathead shield, stretches from Liverpool street, beneath the station of the Great Eastern Railway Co., the city terminus of the North London Railway and the Bishop Gate Street Station of the Metropolitan Underground Railway, through the very centre of the great commercial district of the city, and runs due west under Holborn, High Holborn, Oxford street and past Hyde Park as far as the generating station located at the terminus at Shepard's Bush. It follows the line of greatest traffic in London.

#### GREAT RAILROAD CENTRE.

The road will receive passengers from the great underground central depot, now in course of construction by the Central Railway Company, between the Bank of England and the Royal Exchange, passengers brought in by the main lines of the London and Northwestern Midland and London and Southwestern Railroads. It is especially at this point in the city that street crossing is a perilous task, and the railroad company is now engaged in constructing a series of subways immediately below the surface for the convenience of pedestrians and as approaches to its own station below. From this central depot will radiate not less than five underground tunnels, some 85 feet below the surface, each feeding a separate and populous district of the great city.

#### THE WORK COMMENCED.

The construction of the road itself has been carried out by the Electric Traction Company, who has also financed it. It is this company that has made the contracts with the British Thomson Houston Company, and which will turn over the road fully equipped and in working order to the Central London Underground Railway Company ready for operation.

It was not until three years after the necessary Parliamentary act was passed in 1893, says the *Western Electrician*, that the actual work of building this road could be undertaken. Vertical shafts were driven at six different points to a depth of between 60 and 70 feet, and the tunnelling was begun in four tunnels at once, two running in each direction from the shaft. At each of the stations were driven two shafts 23 feet in diameter and 87 feet deep and one 18 feet in diameter and 76 feet deep—the two former containing two ingress and two exit elevators and the smaller two spiral stairways, one for ascending, the other for descending passengers.

At the stations the widened tunnel is 21 feet in diameter, and 375 feet long. The main tunnels are each 11 feet 6 inches in diameter, and are practically steel tubes driven forward through the clay.

#### AN AMERICAN ROADBED.

Each tunnel will contain one track, one tunnel carrying the east bound trains, the other the west-bound trains. In laying the roadbed the best modern steam railway practice has been followed. The steel rails weigh 100 pounds to the yard, and are laid upon heavy cross-ties. The system of contact will be third rail, with the contact rail placed between the service rails of the track and well insulated. The conductors will be fed at intervals from a copper feeder cable. This feeding will be controlled from the signal boxes, and the operator will be able to cut out any section of the line when necessary. This method of contact is similar to that employed so successfully by the General Electric Company in the installations on the East Weymouth, Nantasket Beach and Berlin-Hartford branches of the New York, Beach Haven & Hartford Railroad. The method of traction, however, will differ radically from that used on the branches above mentioned. Instead of passenger-carrying motor cars, with the motors mounted on the forward axle, locomotives similar in appearance to those used on the Belt Line tunnel service of the Baltimore & Ohio will be used to haul the trains. The reason for this lies in the fact that the tunnel is only 11½ feet in diameter, and that the bottom of the tunnel must accommodate the roadbed. This materially reduces the clearance. The motors require to be suspended between wheels at least 30 inches in diameter to give the necessary clearance between them and the ground and this fact has brought about the locomotive in place of the passenger motor car.

#### TRAINS START ON DOWN GRADES.

In designing the line a decided departure has been made in the arrangement of the station approaches. On each side of each station is a 3 per cent. gradient rising on the approaching side, and falling again to the level of the road on the departing side. This method gives a retarding effect to all trains approaching the stations equivalent to the application of considerable braking power, while materially aiding in the acceleration of all trains as they leave the platforms. Furthermore, the saving in power necessary to secure the requisite rapid acceleration is, by the adoption of this plan, calculated to amount to about 33 per cent.

#### TWO-MINUTE HEADWAY.

The schedule speed of the trains will be 14½ miles an hour, with stops at each station of 20 seconds. The trains will be run at first under a headway of

2½ minutes, which will be reduced as soon as the traffic demands to a headway of 2 minutes.

The generating station will be located in the open air, at the extreme western end of the line near Shepard's Bush Station. In building this the most modern American methods will be followed. The steam will be supplied from Babcock & Wilcox boilers, and the engines, of which there will be six, will be horizontal Allis machines, each of 1300 horse-power.

The electrical system adopted is the three-phase alternating high voltage primary, with reducing transformers and rotary converters. There will be six dynamos, and each will be directly driven by its own engine. These dynamos are of the newly developed rotating field and stationary armature type. Each will have a capacity of 350 kilowatts. The speed of revolution will be 94, the frequency 25 cycles, and the initial electromotive force 5,000 volts. The total capacity of the power station will be 5,100 kilowatts, or 6,800 horse power.

There will be 35 locomotives, the weight of each, complete, will be 35 tons of 2,240 pounds. The trains will be made up of seven cars, weighing, when loaded, 105 tons additional, giving a total train weight of 140 long tons. The seating capacity is calculated at 336 persons.

Forty-nine elevators will be required for the transportation of passengers at the various stations. Each will have a capacity of about 15,000 pounds, or 100 passengers per trip. The speed of elevation will be about 150 feet per minute. These elevators will be of the double-drum type, similar to those built for the War Department at Washington, but of much greater carrying capacity.

It is estimated that the number of passengers which this road will carry per annum is 48,000,000, which, at an average fare of 4 cents, will give an ample return to insure dividends upon the capital stock.—*The Record, Philadelphia.*

### Machinery News.

—A large order for iron poles for export is now being filled by the American Tube and Iron Works at Middletown.

—The Tudor Iron Works, St. Louis, Mo., U. S. A., lately made a shipment of fifteen cars of light rails and fastenings to Japan.

—Mr. R. Yezoya, one of the largest tobaccoists of Tokio, Japan, has been making a tour through parts of this country for the purpose of examining cigarette machinery with a view to purchase.

—Victor M. Braschi, the representative in Mexico of the Rand Drill Company, 100 Broadway, New York City, has secured the order for a 19,000,000-gallon pumping engine to be used by the City of Mexico for its sewerage service.

—The Snow Steam Pump Works, of Buffalo, N. Y., U. S. A., have issued for the benefit of their foreign customers a catalogue of over 100 pages containing illustrated descriptions of its products, together with varied information concerning them and hints as to their use.

—The Brooks Locomotive Works have entered an order for twenty locomotives for the Mexican Central Railroad. The order is divided into ten passenger engines and ten consolidated. The Brooks Works have also finished three locomotives for the Sang Wu Railroad of China.

—The contracts for building the tramways at Liegnitz (Silesia) and Fiume (Austria) have been awarded to the firm that is constructing the electric street railway at Bamberg, Germany. The firm works with the patents of an American establishment (the Walker Company, of Cleveland, Ohio) and obtains the electric machinery from this American firm only.

—Machinery is finding its way into every department of human industry, says the *Age of Steel*. It has come to the rescue of the washtub and the aid of the churn. It threads needles and grinds coffee, curls hair and fastens cuffs, rocks cradles and squeezes lemons on hot days. It is finding its way everywhere, and has not even halted at the steps of a church. Organ motors assist in sacred music, and Edison is in partnership with Mozart.

### A Novel Reservoir.

A RECENTLY constructed reservoir at Pawtucket, R. I., exhibits some novel resorts of a practical nature in engineering worthy of note. The plan of this reservoir, to meet the hilly area, is circular, with an inside bottom diameter of 95 feet, a top diameter of 97 feet and a depth of 12 feet. The concrete used in the construction of the bottom and walls was composed of one part Portland cement, three parts sand and six parts gravel, and the bottom was of concrete 9 inches thick over the whole area, excepting at the walls, where it was increased to 1 foot 9 inches thick; there was no joint or line of junction between the bottom and the walls, both being laid simultaneously as one mass. The concrete of the reservoir walls is 4 feet thick at the bottom and 2 feet thick at the top, the height being 12 feet, with an inside and outside batter of 1 inch to the foot; imbedded in the concrete walls and extending around them are four rings of wrought iron of ¾ to ⅝ inch diameter, the first of these being 1 foot down from the top of the wall and 1 foot from the back, the others 1 foot apart below this. Outside the concrete walls and extending around them is an earthen embankment sloped from the top of the wall; inside the concrete bottom was covered with cement plaster, and finally the walls and bottom layered with hot Trinidad asphalt.

—An exhibition by the Russian Electro-Technical Society is planned to be held in St. Petersburg in 1899, the exhibits afterward to be retained there as an electrical museum. This will afford an opportunity to introduce various American electrical goods which have never before entered that market.



American shoemakers and shoe-menders have got ahead of you. They don't buy whole sides of sole-leather now.

A shoemaker wants 2 or 3 grades and 4 or 5 thicknesses.

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Prices depend upon thickness and quality.

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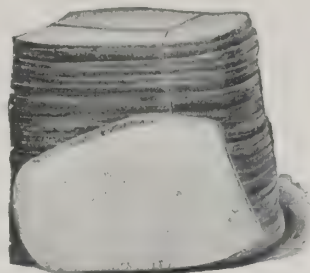
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Good	—6 ".....	2.01 ".....	2.44 "
	—5 1/2 ".....	1.86 ".....	1.92 "
	—5 ".....	1.65 ".....	1.74 "
	—4 1/2 ".....	1.48 ".....	1.54 "
Medium	—6 ".....	1.80 ".....	2.04 "
	—5 1/2 ".....	1.68 ".....	1.80 "
	—5 ".....	1.50 ".....	1.62 "
	—4 1/2 ".....	1.32 ".....	1.38 "
Coarse	—6 ".....	1.42 ".....	1.50 "
	—5 1/2 ".....	1.32 ".....	1.38 "
	—5 ".....	1.20 ".....	1.26 "
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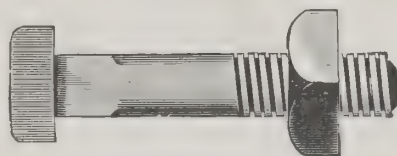
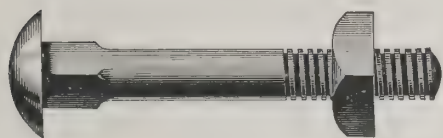
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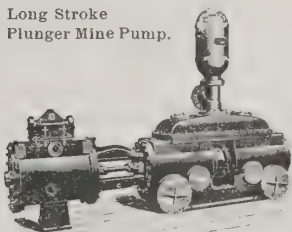
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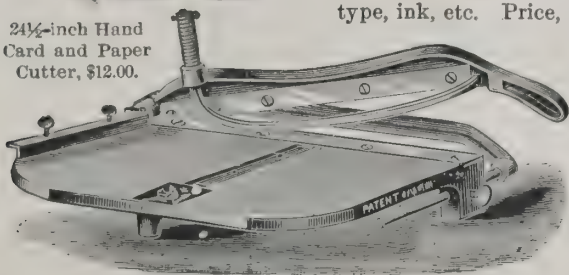
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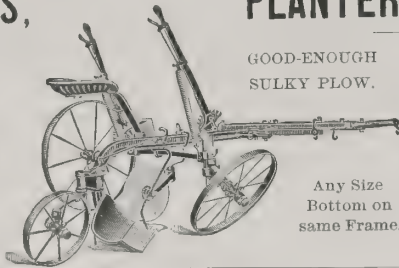
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All kinds, all sizes.

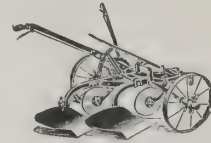


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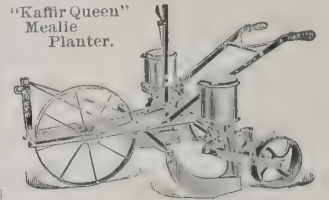


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Any Size  
Bottom on  
same Frame.



Flying Dutchman  
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"Kafir Queen"  
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F. O. B. New York. Special Attention paid to the Requirements of Foreign Countries.

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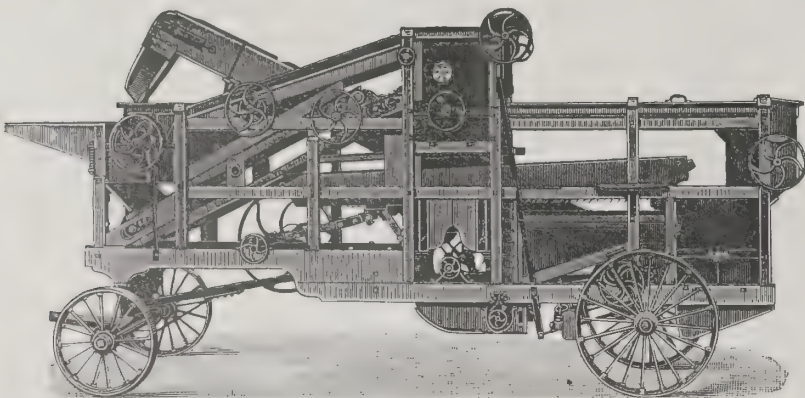
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MANSFIELD, OHIO, U. S. A.

MANUFACTURERS OF

Thrashing Machines, Saw Mills,  
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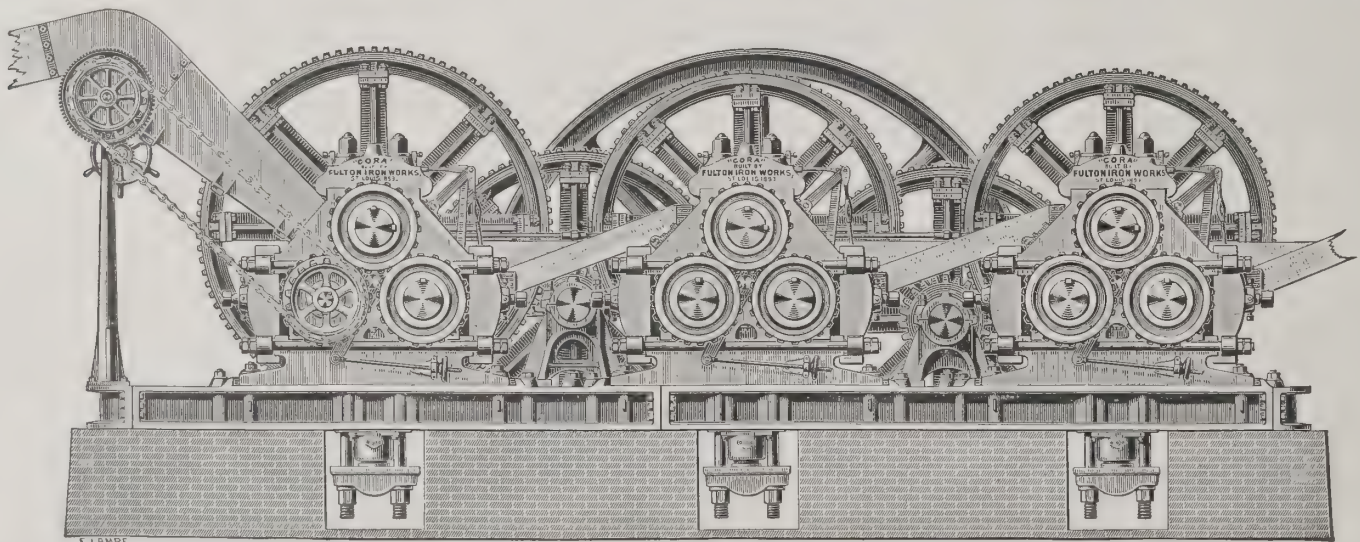
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# "CORA" Nine-Roller Cane Mill.

CORRESPONDENCE SOLICITED.



ESTIMATES FURNISHED.

Built by "FULTON IRON WORKS," St. Louis, Mo., U. S. A.

Per S.S. "COPTIC."

FULTON IRON WORKS, St. Louis, Mo.

HONOLULU, H. I., June 17th, 1895.

Dear Sirs: The nine-roller mill and Corliss engine built and erected for us by you last year has given perfect satisfaction, and we take pleasure in furnishing you with the following report covering work performed by it during the season just closed. Days grinding, 104 $\frac{3}{4}$ ; Tons of cane ground, 61,617.928; Tons of cane ground per day, 588.238. Extraction: 92.49 per cent. total sugar; 82.13 per cent. of cane; Dilution, 7.91 per cent.; Fibre in cane, 11.02 per cent. Average load on hydraulics, 313.2, 334, 344.5 tons.

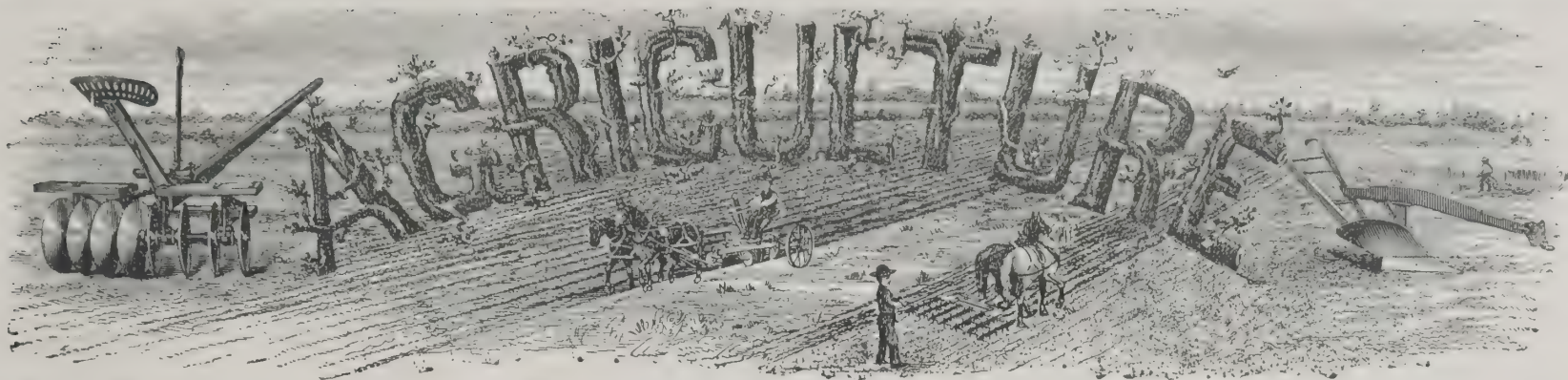
It is hard to say just what is the capacity of this mill, as our boiling house is not of sufficient size to admit of a prolonged test, but we would say that we have ground on a short run over 50 tons of cane per hour, and with an increase of from 50 to 75 tons in the load on the hydraulic obtained an equally good extraction. We believe we have the best mill on the Islands.

Very truly yours,

EWA PLANTATION CO.,

E. D. TENNEY, Secretary.





DEVOTED TO THE FOREIGN TRADE IN AGRICULTURAL MACHINERY AND IMPLEMENTS

### The Future of Farming.

WE have had a good deal of speculation from scientific gentlemen regarding the future of farming; but the following, delivered by a farmer at a farmers' institute, rather takes the lead:

The future farmer may expect much from the use of electricity and mechanical power. Large-sized windmills may develop and store electricity and compress air, and even remote streams may furnish power, coal instead of being shipped in bulk, may be converted into electric energy at the mines and find its way over wires cheaply to the farm, lighting and heating the buildings, running the plows and cultivators, and doing any work required at the turning of a button. Indeed, many wonderful things may be impending to change the character of the future farmer himself. Nothing seems to promise more for the farmer than to liberate him from his slavery to the horse. The horse is called the servant of man, but man—the master—is really the servant. A servant of servants is he, as if the curse of Cain had fallen upon him. The first thought of the waking horseman is to care for his horse; he must be fed even before his master, cleaned, watered and perhaps doctored. He must be constantly watched over, his stable must be cleaned.

The first work of every Spring is to plant for the horse's food. A large part of the farm is for his pasture, his grass, his hay, his corn and his oats. He must have fences to keep him in bounds, and barns more or less costly to shelter him. The horse costs a great deal and when his bill is settled there is frequently but little left for the man. Hitherto the horse seemed to be indispensable, and we have learned to love him, but fortunately he is going, not altogether this year nor next, but steadily and certainly going. Nature is slow, but inexorable in her movements, and man will be the better for the extinction of the horse, and because man is better is why the horse goes. The cow will go too. The chemist will make the butter better from the grass. Hay will be made into clothing, paper, dishes, furniture, fuel, etc. In the year 2000, a long look ahead perhaps, but the child born to-day may live to see it. The population of the United States, it is estimated, will be 500,000,000, the city of Chicago 30,000,000.

When the population of the world so increases that every ten acres will be the home of a happy family, all the lower animals must of necessity be crowded out; life will have taken on a higher phase. The people of the earth will be speaking a common language, united with a common purpose, and governed by the same law. With control of heat and light, the arctic regions will be warmed and lighted and made fruitful, making homes for millions. With devices for drawing down cool air from the upper region, the torrid zone will be comfortably cooled, and a healthy atmosphere brought to every locality. The waste places of the earth will be made everywhere habitable. The task assigned man in the beginning, "To subdue the earth, and have dominion over it" will be an accomplished fact.—*Farm Implement News.*

### Our Modern Plows.

THERE are in the United States, says the N. Y. *Sun*, hundreds of plow factories, including some immense establishments that produce plows in great numbers, besides various other agricultural implements. The plow has long since ceased to be just a plow—there are made nowadays plows especially designed for the most advantageous cultivation of all the various crops and for use in all sorts of soils. American plows are now made in hundreds of styles—there are single concerns in this country that make fifty styles or more.

American plows of all kinds are exported in considerable numbers, and they go pretty much everywhere, all over the world. Makers send, of course, to the several countries the plows best adapted to their crops and soils. They send some plows to Asia, of which the smallest proportion goes to China; many plows to South America; not a great many to the Central American countries, and not very many to Mexico.

American plows are sold in South Africa and in Australia and in Europe; in all the continental countries, and in Great Britain as well.

—A Jefferson County cheesemaker has received a letter from the manager of a leading English cheese house announcing the finding of a note inclosed in a vial in one of the Tyllerville factory cheese, and complimenting the cheese in the highest terms. He says: "The cheese is of grand quality. It is astonishing the quantity of American cheese sold in this country."

### Automatic Duplex Hay and Straw Baling Press.

IT has long been the custom, says the *Farm Implement News*, for farmers to stack their straw out of doors and allow the stock to run to it, partly for shelter and partly for food, although it was well known that about one-half of the straw is wasted by the exposure and the other half seriously damaged as food. This has been largely unavoidable for lack of more room to store the straw, and shelter for the cattle and colts. To meet this difficulty in Indiana a concern is manufacturing a duplex baling press with automatic self-feeders. As it is manifest that a duplex baler will bale just twice as much hay or straw as a single machine, this increase in capacity would seem to make it practicable to bale all the hay and straw on the farm. There are many arguments in favor of doing so, provided it can be done quickly and at reasonable cost. Among these arguments, it occurs to the writer that straw baled immediately after threshing is almost as valuable for food as hay; that probably fifty tons of baled hay or straw can be stored in a mow or shed that would store five tons of loose; that baled hay or straw is always ready for market, and a team can haul three times the quantity at a load, besides being much easier to handle; that while cattle or horses may maintain life while shivering at a straw stack, they would prosper on a less quantity of sweet baled straw in shelter; that while probably one-half of stacked straw is wasted and the other half damaged, one-half could be sold, if baled, and yield a profit over the cost of baling all. Many other similar arguments will present themselves to the intelligent farmer, according to the conditions existing in his locality. Another point to consider is the cost of baling to the farmer and the profit to the operator of the machine. We are assured, and there seems no reason to doubt, that this baling press has the capacity to bale straw as fast as it can be threshed. The operator could follow the thresher, furnishing and boarding his own crew, baling from thirty to fifty tons per day during the threshing season, at the end of which the season for baling hay would begin, thus giving him a season's work of considerable length. Recently one of these presses was subjected to a severe test under unfavorable conditions. The press was taken to an old straw stack that had been standing since last Summer, and, operated by a crew of green hands, turned out 114 bales in 84 minutes. With experienced men it is certain that this capacity could be greatly increased.

AT the show of the Royal Agricultural Society, of New South Wales, held at Sydney in April during the Easter season, the following American implements and machines were on exhibition and received particular notice from the local press: The harvesting machines of Deering, Wood and McCormick; the Mast-Foos and the Althouse "vaneless" windmills; the plows in variety of Deere & Co. and the Moline Plow Company; the Planet, Jr., cultivating tools, besides various makers of sulky rakes, corn shellers, corn and cob grinders, harrows, cultivators, etc. The Sharples cream separator was also shown. In fact, American machinery was profusely exhibited either under makers' names or by agents.

AMONG the American machines on exhibition at the recent Bath and West of England show that received particular notice from English trade journals were the harvesting machines of the Deering Harvester Company, the ball-bearing features of which attracted much favorable attention; of the Walter A. Wood Mowing and Reaping Machine Company, on account of anti-friction roller bearings, adjustment of reel, etc., and of the McCormick and Adriance Buckeye for distinctive features. Deering horse rakes, Thomas horse rakes and tedders, Syracuse chilled plows, Planet, Jr., goods and the Aspinwall potato planter received special notice. Besides these, various American and Anglo-American harrows, cultivators, etc., were on exhibition and favorably noticed.

—At the field trial of mowers held at Gisors, France, recently the first three prizes fell to American machines. They were: first, Johnstone; second, Osborne; third, McCormick. There were nine competitors in all.

—A switch and signal company, of Swissvale, Pa., has decided to begin the manufacture of air and gas compressors which can be connected to electric generators or to steam engines, or can be driven by belt from the line shafting. The company has made several satisfactory tests of compressors suitable for air-brake purposes for street cars, and for electrically propelled trains, and it is further proposed to manufacture large air compressors for the general distribution of compressed air about workshops, and for the compressing of ammonia for freezing purposes.



## Insects of Commercial Value.

IN beginning a series of papers on beneficial insects I will mention first those which have a money value, taking up later such as render a service to farmers by destroying injurious species. Of the few insects the products of which are to be found in the markets, the most important is the silkworm. There are several species, but the one producing most of the silk of commerce is a native of China, where silk was first used. These insects were jealously guarded by the Chinese and none were allowed to be taken out of the country. There are various stories told of the manner in which they were smuggled out of China by travellers who wished to introduce them into their own country. They are raised now in nearly all civilized lands, the rearing of silkworms being an important industry.

Some idea of the value of this industry may be obtained from the statement that the United States alone manufactures more than \$40,000,000 worth of silk goods annually. Considerable of the raw silk to supply this demand is imported, so there is still a profitable field of employment for many more people.

The honey bee stands second in the value of its products. These little creatures are so well known that a description of them is not needed here, yet there are many curious and interesting facts about them, known only to a comparative few. I recommend to the reader a short sketch entitled "The Pastoral Bees," by one of the most pleasing of American writers—John Burroughs.

Honey and wax are both staple articles. This country exports many tons of each. It would be interesting to know the amount of beeswax used in the world. Catholic countries, especially, consume great quantities of wax candles, probably several millions of dollars' worth yearly in a single country. Besides being made into candles, wax is used for modelling, for flowers, wreaths, ointments and various other things.

The gall-flies, by causing injuries to plants, produce an article of commerce. There are many species of these all over the world, and by stinging leaves and stems they cause a swelling to appear called a gall. The egg is laid at the time, the stinging is done, and the young grub lives in the gall, feeding on the vegetable tissue. From the galls of the oak, sumac and other trees gallic acid is obtained, which is used in photography and medicine, for dyeing and making ink, and for tanning some of the fancy kinds of leather. The galls having a market value are the Aleppo, Hungarian, Mecca, East Indies, Chinese and Turkish. Of the last there are more than 300 tons shipped every year from Constantinople.

The blister beetle, or Spanish-fly, as it is commonly called, produces what is known in medicine as cantharides. It is a bright green beetle, found in Spain and other parts of Southern Europe. It feeds on the leaves of small trees, and to catch them sheets are spread under the trees, which are jarred so that the beetles fall into the cloths, when they are dipped into hot water and afterward dried. They emit a volatile substance which causes inflammation of the eyes, nose, mouth and throat, and if handled they blister the skin. The people who collect them usually wear veils and gloves for protection. The beetles are ground up and mixed with wax, resin and lard to form blistering plasters.

The cochineal insect is found in warm parts of America, where it feeds on a species of cactus. The bodies of the female only are used for dyeing. They are brushed from the tree with the tail of some small animal, and the gathering is a slow and tedious process. They are killed by heat and dried. It takes about 70,000 dried insects to make a pound.

The kermes insect is closely allied to the cochineal, but inhabits the old world instead of the new. It is a scale insect similar to the oyster-shell bark-louse which is so common on fruit trees, and sticks closely to the scrub oak, on which it lives. It is collected by women and children of the East, who scrape it from the trees with their finger nails, which they allow to grow very long. It is supposed to have been kermes dye that was used in coloring the curtains of the Jewish tabernacle mentioned in the twenty-sixth chapter of Exodus.

The lac-insect is very much like the cochineal and kermes, but is noted for secreting a resinous substance called lac. This is collected, melted and strained, forming the shellac of commerce, which is used in the manufacture of varnish. The lac-insect is found in India and China, and more than 5,000 tons of the lac are exported annually. Besides being made into varnish it forms a part of sealing wax and lacquer.

The celebrated lacquer-ware of China is made of thin wood and covered with lacquer, beautifully ornamented and sometimes very costly.

The wax-insect is a native of China, and like the three preceding, is a scale insect. It secretes a very fine, hard, white wax, which is used in making the most costly candles, and for other purposes where a superior quality of wax is needed. There are several species of wax insects in other parts of the world, but only the wax of the Chinese insect has as yet been used.—F. P. BRIGGS, in the *Epitomist*.

THE average man may imagine that garnets are used in the jewelry line of business exclusively, whereas in fact the jewelry trade cuts a small figure in the garnet industry. About 3,000 tons of garnets are used every year in this country for making sandpaper, or more properly, garnet paper. A very small proportion of the garnets have any value to the lapidary, and the best are only semi-precious stones. The costliest come from the Adirondack regions and from Delaware County, Pa. Up in Alaska, near the town of Wrangel, is a veritable garnet mountain, and a corporation has recently been organized to develop it. The Alaska garnets are said to be unusually fine.

—An Evart, Mich., tool and handle factory has made 3,000 handles from ironwood as an experiment. It ought to make a good handle.

## Exports Record Broken.

THE monthly statement of the exports and imports of the United States, issued by the Bureau of Statistics for the month of June makes a remarkable showing. Never before in the history of this country have the exports of merchandise, which include practically all exports except gold and silver, reached so high a figure as in the fiscal year ending June 30, 1897, nor has the excess of exports over imports ever been so large. The statement for 1897 with comparison is as follows:

MERCHANDISE.	June		Twelve months ended June—	
	1896.	1897.	1896.	1897.
Domestic .....	\$64,928,447	\$72,866,880	\$863,200,487	\$1,032,998,880
Foreign .....	1,777,424	1,807,809	19,406,451	18,988,211
Total .....	66,705,871	74,174,689	882,606,938	1,051,987,091
IMPORTS.				
Free of duty ...	25,130,398	41,153,263	369,757,470	381,932,605
Dutiable .....	31,033,342	43,672,847	409,967,204	382,441,300
Total .....	56,163,740	84,826,110	779,724,674	764,373,905
Exports, excess	10,542,131	.....	102,882,264	287,613,186
Imports, excess .....	.....	10,651,421	.....	.....

## Our Increasing Export Trade.

DURING the eleven months ended May, 1897, merchandise to the value of \$960,130,507 was exported from the United States. This is a gain of \$161,858,467 over the corresponding period of the previous year. The exports for the month of May alone amounted in value to \$76,806,062, being \$11,718,471 more than for May, 1896. The following table shows to what particular lines this great increase is due:

	Ma. 1896.	May, 1897.
Agricultural implements .....	\$536,520	\$561,396
Brass, and manufactures of .....	88,010	119,741
Carriages and vehicles .....	162,007	190,501
Copper, manufactures of .....	63,987	88,011
Cycles, and parts of .....	380,867	888,835
Glass and glassware .....	100,681	112,034
Scientific instruments and apparatus .....	262,848	332,823
Cutlery .....	15,588	16,691
Firearms .....	45,968	47,596
Builders' hardware .....	331,817	375,692
Saws and tools .....	199,006	209,284
Sewing machines, and parts of .....	277,891	288,092
Printing presses, and parts of .....	18,046	52,196
Locomotive engines .....	271,082	442,820
Stationary engines .....	16,110	28,306
Boilers and parts of engines .....	24,434	41,820
Machinery (not including boilers, engines, printing presses and sewing and type-writing machines) .....	1,478,432	1,731,440
Stoves and ranges .....	24,055	31,124
Jewelry, and manufactures of .....	38,729	69,503
Boots and shoes .....	101,445	154,349
Roofing slate .....	41,126	124,449
Musical instruments .....	81,706	98,353
Paints and colors .....	78,097	85,769
Paper, and manufactures of .....	275,054	344,091
Plated ware .....	26,789	45,662
Silk, manufactures of .....	15,829	23,327
Starch .....	121,149	271,706
Stationery, except of paper .....	75,783	86,254
Tin, manufactures of .....	27,167	30,683
Trunks, valises and travelling bags .....	9,522	12,045
Doors, sash and blinds .....	43,130	48,290
Household furniture .....	297,880	372,267

## Trade with China.

THOMAS R. JERNIGAN, our Consul General to China, presents some figures in *The North American Review* which will be interesting to all American manufacturers who are engaged in the exportation of goods to the Empire and to others who are alive to trade opportunities. For the year 1896 the total of Chinese exports and imports was \$270,273,846, the largest foreign trade the Empire has ever had for one year. The tendency is toward wider trade relations with other nations. Practically undeveloped, the vast Chinese Empire now presents possibilities of unprecedented magnitude. Our trade with China last year was nearly \$20,000,000, an increase of 60 per cent. in seven years. Great Britain gets the largest part of the trade. Russia also owing to the intimate relations which she sustains to China secures a large percentage.

IT has become evident of late that opportunities for increasing the export trade of electrical apparatus are very encouraging. A financial journal states that the exportation of electrical machinery, materials and appliances is to-day as heavy as any other class of manufactured articles shipped from the port of New York. There is hardly a steamer leaving New York that has not on board shipments of electrical goods. These export shipments are difficult to trace, for the reason that electrical appliances are often classified with other kinds of machinery and hardware on the ship's manifest. The export trade in telephone apparatus during June seems to have been unusually heavy. It is stated that two exporters shipped upwards of \$25,000 worth of goods, and there are at the present time further inquiries in the market for telephone lines in Central America.



THE CASE GRADUAL  
REDUCTION MILL.  
MACHINERY, ROLLS,  
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FLOUR DRESSERS,  
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Belt, Steam, Hand Power and Electrical

CRANES  
HOISTING MACHINERY  
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APPLIANCES.

All Sizes of  
HOISTING AND WHEEL  
CHAINS.

THE CASE MAN'F'G CO.  
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## COFFEE MACHINERY.

The Monitor Coffee Separator and Grader

Will make clean separations and grade in one operation.

The Monitor Coffee Milling Machine,

The most perfect miller for coffee ever offered. It will do the finest work on tender as well as hard coffees, and do it without waste or breakage.

These Machines are in successful operation in many of the largest Coffee Houses in this country, and are well worthy of investigation by Handlers of Coffees.

Can be bought direct from manufacturers or through any reliable exporter.

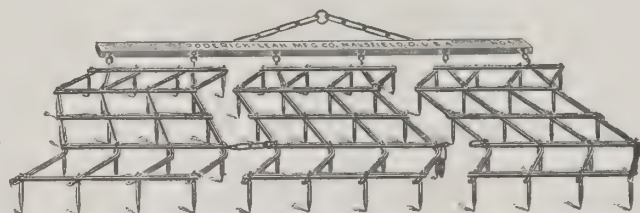
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## THE LEAN ALL-STEEL HARROWS



Have been in the Market over 25 years and EXCEL ALL OTHERS.

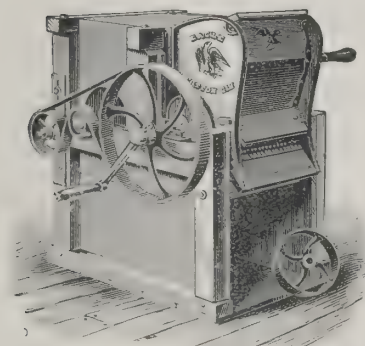
A large variety of Styles, Sizes and Weights suited to the Requirements of any Country. Manner of Packing secures Lowest Rates for Transportation to all Parts of the World. Write for full Descriptive Matter and Lowest Prices. In ordering through Commission Houses send Duplicate Order to us.



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Mansfield, Ohio, U. S. A.

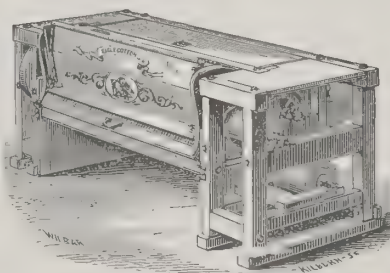
## EAGLE COTTON GINS.



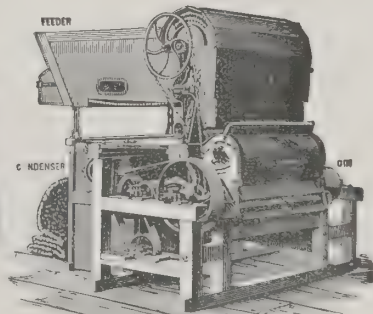
These Gins enjoy a BETTER REPUTATION THAN ANY OTHERS OF THEIR CLASS IN EXISTENCE, and are PREFERRED to all others made, on account of their STRENGTH, SIMPLICITY, DURABILITY, the amount and EXCELLENCE of the work they accomplish, and the RAPIDITY of their operation.

For further details, illustrated Catalogues will be furnished on application.

Eagle Cotton Gin Co. { FORMERLY Bates, Hyde & Co. } Bridgewater, Mass.



Power Gin with 12-inch Saws.



Power Gin with 10-inch Saws, with Feeder and Condenser.

Is SUPERIOR to "CORN STARCH," "ARROWROOT," "SAGO," Etc.

TRADE MARK  
**MAIZENA**  
(DURVEA.)

This is a brand for a preparation from the choicest parts of Indian Corn, or Maize, making a healthy and nutritious article of food, and a most

**DELICIOUS TABLE LUXURY.**

ITS PURITY AND DELICACY ADAPT IT TO BEING USED IN A GREAT VARIETY OF EXQUISITE DISHES.

ENCOMIUMS TO ITS MERITS:

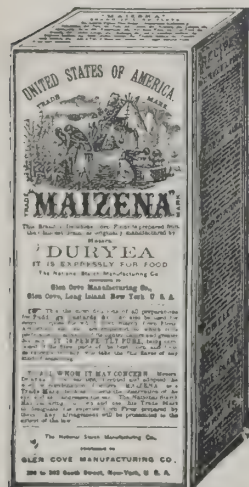
LONDON, 1862. "Supremely Excellent."  
BRUSSELS, 1874. "Notably Excellent."  
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Put up exclusively by THE NATIONAL STARCH M'F'G CO., successor to (Messrs. DURVEA) GLEN COVE MANUFACTURING CO., N. Y. U. S. A., in 40 and 20-pound boxes, in packages of 1 lb. and ½ lb., and may be obtained through all importing houses of South and Central America, and the West Indies, and all export houses of the United States and Canada.

None GENUINE without "DURVEA" appearing on the face of Package.



Gold Medal Awarded  
"MAIZENA."





## ELECTRICAL NEWS.

### Electricity's New Uses.

IT is estimated that the various companies which manufacture electrical apparatus for purposes outside of electric light, the trolley cars, the telegraph and the telephone make and sell \$20,000,000 worth of goods every year in this country alone. Electricity is so readily put to service whenever it is available that it is becoming a servant in the affairs of daily life in many different ways, and so invidiously that people scarcely notice its approaches. Its rivals in the field of distributing power are steam, water under pressure, compressed air, gas and belts and shafting. Belts and shafting and water under pressure can do but one kind of work, and neither can supply light nor heat. Steam may be used for heating purposes, but it cannot be turned into light, and even its heating qualities are confined practically to temperatures not much above the boiling point of water. Compressed air will do refrigerating, but not heating or lighting, and gas, which gives both light and heat, cannot be used for the production of power except by combustion. Incidentally, it may be mentioned that it has been demonstrated recently that for illuminating purposes gas can be used more economically by employing it to drive a gas engine coupled to a dynamo and getting the light from incandescent electric lamps than by burning the gas directly for lighting purposes.

Even if steam, air, water and gas each combined the qualities of producing at will light, heat and power electricity would still have vast advantages over them all, because the transformations can be made in its current more readily and its conveyance is accomplished by simpler means. A familiar exemplar of this is the electrical door bell. You can buy a complete bell outfit for 89 cents and set it up yourself. Think of trying to utilize gas or water or steam to drive the cooling fan in a lady's boudoir or her husband's office. No doubt it could have been done, but the noise and oil and smell would soon have doomed any attempt to utilize one of these forces. Now it requires but a flexible wire cord for connections; the fan can be changed from room to room by merely unscrewing a lamp and slipping in its place the end of the cord, and the noiseless motor goes or stops in answer to the turn of a button.

Does a woman wish to curl her hair? There are curling-iron heaters made which are as easy to connect and manage as the electric fan, and far handier and neater than one on a gas jet. She sits at ease in front of her dressing glass and the heater stands on her dressing case wherever it is best at hand. There is no flame. The wires run to a convenient electric lamp socket and the current comes down through them and turns to a red heat a coil of German silver wire concealed within the heater's case. The lady slips her curling iron within this coil and heats it quickly and evenly and without a possibility of smoking it.

The electrician has more clever devices for a woman's use. Does she want a cup of tea? For \$3 or \$4 she can buy an electric stove which she can use as handily as she did the curling-iron heater, taking the current for it from a lamp socket. It will be about six inches across and capable of boiling the tea kettle or coffee pot, making a stew, fry or a Welsh rabbit, or in fact performing any work that might be done over the flame of a chafing dish. In the sewing room she can have the sewing machine run by an electric motor and an electrically heated sadiron to smooth out seams, flatten bindings and do the many like services required in dressmaking, and she may sit with her feet on an electric foot warmer, or even take it to bed with her. For the sick room she can buy an electric heating pad to be used as a substitute for a hot water bag or bottle and ever so much better. These are very cleverly made of asbestos or other suitable material, and they take their current from the ever ready electric light socket. By means of a switch the nurse can fix the temperature of the pad at any one of three points, and so long as the current remains on the pad will never get either hotter or colder. For the kitchen entire electric cooking outfits may be had, but to-day for these has not arrived yet, although it is claimed that, considering the great economy with which heat is utilized in them, all sorts of cooking, except boiling, can be done with them at as low a cost as with coal or gas.

While a woman is thus served by electricity at home her husband is benefiting by it elsewhere. The car that takes him to his office is driven by it and he lights his cigar at an electric torch before he goes to his desk. Push buttons about his desk call his clerks and messengers, the telephone stands ready at hand for him to transact business with people afar off and electric fans keep him cool. There are big ceiling fans at the restaurant where he lunches, which not only cool the customers but also drive away the flies. If he started out with his last Summer's straw hat on he may surprise his wife on his return by showing it to her revived in all its pristine glory at a 25-cent clean-your-hat-while-you-wait place where such good and rapid work is made possible only because of electricity. After the operator washed the hat with a cleansing and bleaching compound he put it on a form where an electric motor turned it about thousands of times a minute and sent the fluid flying out of it in a spray. Then he pressed it with an iron heated either by gas or electricity and finished drying it before an electric fan.

Before the man goes home, if he is in a good humor, he may buy an electric railway for the children, for there is such a toy in the market. It consists of a circular railway with a train of cars that run around it driven by a current which is taken from a battery. In France this same idea has been used to facilitate table service. A circular railway is hung above the dinner table, a little back from the edge of the table. On this runs a car which each person can control by a push button at his place. If he presses the button the car comes and stops in front of him. Then he can put his own plate on a serving dish upon the car and have it carried along to the server or any other person.

Such are some of the minor uses of electricity in everyday life which have

already been adopted in many parts of the country, but the more important field in which the smaller electric devices are forcing their way is the workshop. One of the cleverest and most useful of the new electrical tools is the soldering iron. Every one has seen a tinner at work with his furnace and irons. He would work a little while and then poke the iron back into the charcoal furnace and either wait for it to be treated again or bring forth a fresh iron from the furnace. In later times in canning factories and such places naphtha or gas furnaces have replaced the old charcoal fires, but still the tinner has had to work with a number of irons to keep busy, and these were often too cool or else so hot that the tin was burned off. With the electric soldering iron the furnace is done away with entirely and the irons are always at just the right heat to do their work properly. Except that these irons have wire cords running to the end of the handles and a jacket over the copper head, they appear like the ordinary soldering iron. Within the jacket lies concealed a coat of wire and this supplies the needed heat. In all the big electrical works all the soldering is done by means of these irons.

Many factories are not only supplied with a great variety of special electric tools but also use electric motors for the direct driving of nearly all their machinery. A notable example of this is in a new shirt factory. Beyond the work of heating, which is done by waste straw, the whole place is run and lighted by electricity. The sewing machines are driven by it, the collar and cuff ironing machines are worked and heated by it and all the flatirons are electrical.

One of the most potent advantages claimed for the electrical sadiron and tailor's goose is that no heat is wasted and the iron can never do any harm if left standing. The grasping of the handle in most makes puts on the current and the iron heats up, and the current is cut off and the iron begins to cool the moment you let go of it. The owners of the factory declare that electricity is away ahead of other power, being more cleanly, less noisy and more satisfactory in every way.

Tiffany & Co.'s great silverware factory at Forest Hill, N. J., depends entirely upon electric motors to drive the machines which are used in each department. In one place a visitor may see delicate drills and polishing wheels running by electricity, and in another the same power operates a hydraulic press capable of exerting a pressure of 1,000 tons, while in another room the same current is electro-plating and gilding. Out at North Tonawanda, near Niagara Falls, is a great bolt and nut factory in which every machine is driven by electricity. Here big motors run great lines of shafting, and these in turn drive the machines which transform the raw bars of steel or iron into finished bolts and nuts. The same work could undoubtedly be done with economy by steam engines. The intention to use electric power from Niagara Falls might explain the installation here, but there are many other factories where no such reason would hold. Yet there are other good reasons for doing it. One of these is economy in room. In the nut and bolt factory the motors are carried on platforms hung from the roof rafters over the heads of the workmen, and above all the machinery on the floor, and this is done in many other places. A steam engine could not be treated so, nor would it be handy to have it in such a position, for steam engines require constant attention. Not so with the electric motors. They are made for the roughest uses and the greatest exposures, and, cased in dustproof and waterproof covers, they defy everything. In the bolt and nut factory the only attention they require is to be oiled, and this is attended to by filling the oil wells once in every six months.

Besides running the fixed machines in factories and shops the handiness with which a current can be conducted has made electricity a favorite for driving tools which are used about the floor or in yards, such as drills, punches, shears and small presses. One of the handy tools of this sort has the electric motor on wheels and a flexible shaft running from the motor to drive the tools.

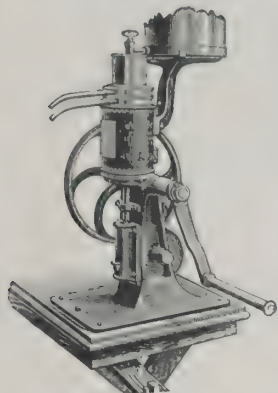
In textile factories the electric motor is making its way rapidly for driving looms, spindles and carding machines, and for printing presses they have no rival for efficiency and ease of control. Another of their very important uses is the driving of pumps. For this purpose they are made of all sizes, from that required for the little house pump, which would run with an electric light current, to tremendous machines adapted to pumping the whole water supply of a city. There are a dozen cities in this country which pump their town water into the mains by electricity. Then there are motors and pumps meant for the rough work of sinking mines or keeping them clear of water and others for pumping water, stone, sand, coal or grain through centrifugal pumps, such as are used for dredging.

Everywhere that one sees the electric motor applied it becomes apparent that no other motor could compete with it for economy of space and the ease with which power can be carried to it, and there are many situations where these qualities make it possible to be used when all other powers would be out of the question. With all of these advantages it has one other, which is of vital importance. This is economy in the use of power. A good motor will return in actual work more than 95 per cent. of the energy that reaches it, while no engine driven by other powers will approach this figure.—*New York Sun*.

MANUFACTURERS of electrical machinery in America are enjoying a brisk trade in foreign countries. South America and the leading nations of Europe are among the generous buyers of their goods, and recently the shipments have been extremely heavy. The *New York Commercial Bulletin*, in speaking of the brisk trade in electrical apparatus, says: "The aggregate shipments to Europe during the month of June by three of the leading electrical machinery manufacturers reached a value of upwards of \$200,000. Germany and England took the largest shares of these shipments. It is said that a considerable quantity of the machinery that went to those countries during June was for local use and not to be exported."



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100,000 machines in use in every country in the world.

A saving of 10 to 20 per cent. in any climate, and 25 to 100 per cent. in warm countries.

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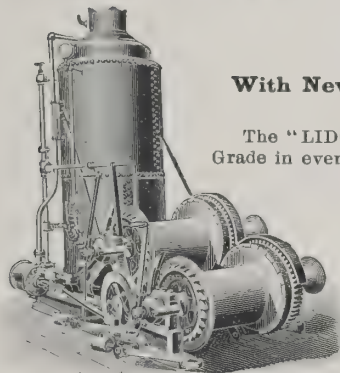
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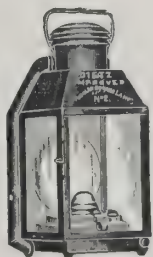
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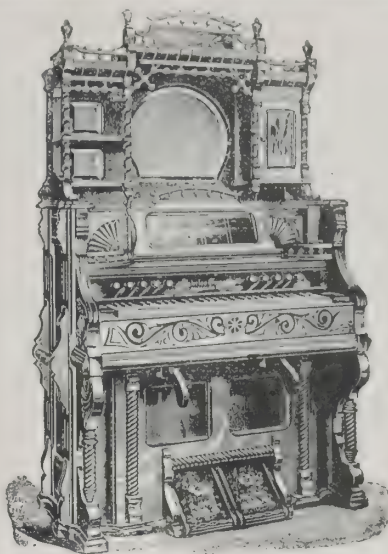


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A TRADE BRINGER.

THE **DE LONG HOOK AND EYE.**  
WHY?

Well, when women use it once, they use it again.

Absolutely it will not unhook unless you unhook it yourself.

It's genuine if on the face and back of every card of the famous De Long Hooks and Eyes you find the words:

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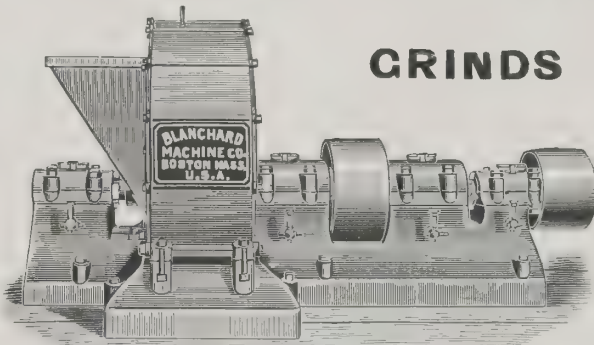
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Large capacity. No skilled attendants. No special foundation.

**SIMPLE. STRONG. COMPACT.**

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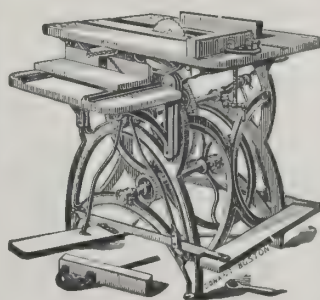
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# MARSTON'S FOOT AND HAND POWER SAW

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Weighs 300 pounds. Gauges slide in planed iron grooves in top. Gears are all machine cut. Shaft and arbor are made of steel.

Price, - \$60.00.

With boring table and side treadle, \$67.00.

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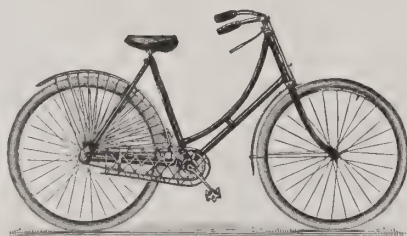
We build bicycles of the finest quality only and have nothing to offer either in cheap or medium grade wheels. Our discount for export is 30 per cent., and we deliver machines properly boxed f. o. b. New York. Order through your commission house and send copy of order direct to us.



**TRIBUNE MODEL 27.**  
Price \$100. Weight 23½ lbs.

This is our standard men's wheel and is suitable for all kinds of road use. It is built in three heights of frames, 22½, 24 or 26½. The wheels are 28 inches diameter; 26 inches will be furnished if preferred. Gear, 68; options, 60, 63, 72, 73 or 80; cranks, 6½ inches, 7 inches if preferred. If not otherwise specified, all machines will be fitted with Hartford or Morgan & Wright tires. All wheels are supplied with tool bag, tools and repair kit. Regular finish, black enamel, nickel trimmings. If a lighter wheel than the above is desired, order should specify Model 21, which will weigh with light road equipment about 20½ lbs.

## Tribune Bicycles.



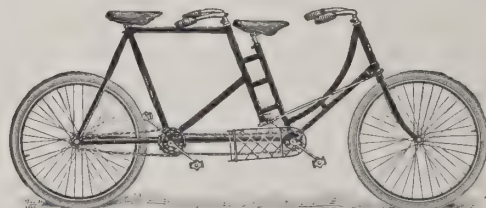
**TRIBUNE MODEL 24. Price \$100.**

Our ladies' wheels are built in three heights of frames, 20½, 22½ or 24 inches. 20½ inches is standard and will be shipped if not otherwise specified. Wheels, 28 inches, can be furnished, with 26 if preferred. Regular gear, 63; options, 56, 60, 68 or 72; cranks, 6 inches throw. The weight is about 24 lbs.

The Celebrated  
Cycloidal  
Sprocket.



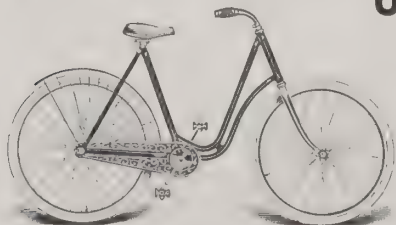
Used on  
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Bicycles only.



**TRIBUNE MODEL 23.**  
Price \$150. Weight 44 lbs.

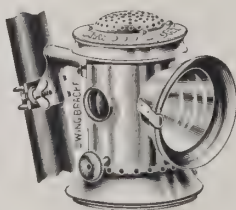
Our tandems are also built with double diamond frame for use of men riders. Wheels are 28 inches; height of frame, 24 inches; ladies' forward frame, 20½ inches. Gear, 68; can fit with 72, 76 or 80, if desired.

## For the Leading American Wheel Order the "GREAT EASTERN."



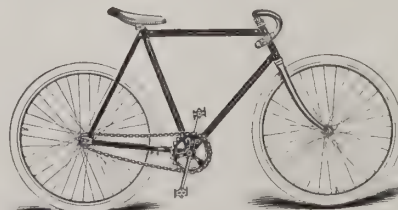
It is up to date,  
very handsome and  
attractive,  
beautifully finished  
and a great seller.

SEND FOR 1897 CATALOGUE "B."



ALSO ORDER THE  
"ATWOOD LANTERN."

It is a perfect burning light; it will not jar out; it has a swing bracket, and will always stand perpendicular no matter where you lean the wheel.



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THIS DEPARTMENT IS DEVOTED  
TO THE FOREIGN TRADE IN  
CYCLES AND SUPPLIES.

### Exports of Bicycles.

THE following table represents a single week's exports of bicycles from the port of New York.

	Crates and Packages.	Value.
Antwerp.....	53	\$3,597
Alexandria.....	8	507
Amsterdam.....	561	18,930
Africa.....	3	262
Aden.....	1	55
British Possessions in Africa.....	34	2,624
Berlin.....	32	1,550
British West Indies.....	49	2,487
Bremen.....	30	1,495
Belfast.....	1	125
British Australia.....	37	6,140
Breslau.....	1	82
Bristol.....	1	113
British Guiana.....	4	300
Cologne.....	4	480
Central America.....	8	230
Cuba.....	2	80
Dublin.....	1	100
Danish West Indies.....	18	849
Dutch West Indies.....	3	170
Frankfort.....	100	5,000
Florence.....	31	1,575
Furth.....	2	143
Genoa.....	30	2,239
Galway.....	2	100
Glasgow.....	37	2,175
Hull.....	25	3,218
Helsingfors.....	2	301
Havre.....	75	4,385
Hong Kong.....	5	240
Hamburg.....	766	58,692
Liverpool.....	360	12,852
London.....	1,135	48,711
Lisbon.....	29	1,163
Newfoundland.....	36	1,565
Porto Rico.....	1	32
Rotterdam.....	225	11,240
St. Petersburg.....	7	1,245
Southampton.....	170	10,445
Stockholm.....	3	668
Turin.....	1	92
U. S. of Colombia.....	2	243
Venezuela.....	25	1,512

Total value..... \$207,000

LEVIN B LEFEVRE has taken out a patent on a bicycle stand capable of forty different adjustments, thereby rendering the overhauling, exhibiting or repairing of a wheel much easier in view of the many accessible positions obtained. The construction provides a tubular standard with a shaft therein with an arm having a cross head to receive the bicycle frame. Disks rigidly connected at right angles to each other are provided with peripheral detents, with hinged connections between said disks, shaft and arm with spring pressed pawls upon the shaft, and said arms to engage the detents in the disks. The cross head of the arm is provided with stirrups and with a sliding hook to hold the bicycle frame. One of the best features of the stand is its usefulness as a health exerciser or home trainer. For this purpose it is adjusted so as the tires will be a little from the floor, and when used for this purpose the rear wheel runs on rollers, the amount of strength to revolve the wheel being entirely dependent upon the fancy and disposition of the rider.

—A sewing machine dealer at Bay City, Mich., is said to be working on an invention which he believes may revolutionize the bicycle world. It does away with the pneumatic tire on wheels and substitutes a solid tire, the resilience being furnished by springs set in the rim. This bicycle would be punctureless, would be less liable to accident, and would, it is claimed, combine all the comfortable features of the modern bicycle.

### Why We Lead in Bicycle Manufacture.

A CLEVELAND, Ohio, manufacturer of bicycles, recently returned from Europe, in speaking of the export of wheels, said: "It is impossible for other countries to equal American goods until they have the means and the men. By the means I mean automatic machinery. America leads the world in these devices. Automatic machinery may be bought, but unless men know how to operate it good results cannot be obtained. As an illustration, a certain well-known French cycle maker purchased thousands of dollars' worth of American machinery. He imported it to France. The investment, however, came to practically nothing, as the French workman could not operate it. There is no discounting a French workman's ability when it comes to certain things, but the use of automatic machinery he has not yet mastered. In the last six months the makers of automatic tools have been rushed to death with demands made on them by English bicycle manufacturers, all of whom are anxious now to get in automatic machinery. The London agents of all these various American concerns are turning away orders constantly, as their factories have now more than they can do.

"The American cycle manufacturers have done more for American export business than any other one class of men since the foundation of the Republic. This may seem a very broad statement, but we believe that it is a fact. The world for years has been thinking that Americans were the finest mechanics on the globe. It was largely a theory; the aggressive American cycle makers have now made it a fact, as there is not a civilized country in either hemisphere in which at least a half dozen American-made wheels are not well and favorably known. The finish, the construction, the mechanical nicety and strength, as well as proportions, verify the opinions of the people that American mechanics have no equal."

### Paper Bicycle Tubing.

IN the manufacture of wooden frames for bicycles the rods are turned from rock maple or hickory, polished, and the connections made with aluminum bronze lugs. In the making of wood-pulp tubing for the frames the rods are molded large, compressed, strengthened with brass sleeves at intervals, stained, after smoothing, to imitate walnut or mahogany, and the connections are made with steel lugs.

The process of making steel tubing for wheels from paper seems to be the most efficient, and is of interest. The paper tube is made by winding a fine grade of thin manilla paper upon a mandrel with a coating of special glue sprayed on the paper. As the latter is wound upon the mandrel compression rollers bear upon the tube in process of formation, which pressure causes the texture of the tube to be extremely dense, about forty layers of paper being used. In the operation of pressing, interior expansion is resorted to, as any outward pressure would disturb the alignment of the paper layers. The mandrel is removed and the tube placed in a strong mold, so that when heavy hydraulic pressure is brought into the core of the tube the interior layers of paper are pressed outward, thus compressing the layers without fracture. The outward layers then receive treatment in a rolling machine, which compresses and hardens the surface. The tubes are then turned and polished in a lathe. The mahogany finish is obtained by fitting up a tin-lined chest and admitting steam into this after having put in a quantity of dry salts of ammonia. The fumes from the salts will attack the coloring matter in the paper tube, drawing it to the surface, so that when a coat of mahogany shade of filler is put on, worked well and thoroughly gone over with shellac, a good mahogany finish is the result.

—Cycling is being rapidly taken up in Italy, and Venice is becoming an important market, since it supplies one of the largest regions of superficial area of the Italian peninsula, and one which is covered with a network of magnificently built macadamized roads, tended with the greatest care, so that they are always in good condition. The principal bicycles used in Italy, according to an English paper, are of American manufacture.



## Notes of Interest.

—The Pennsylvania Steel Company has closed a large order for steel rails for India.

—The American Consul at Bradford, England, reports that in that city large quantities of brass ware made in New York is being used.

—It is reported that President Diaz of Mexico has ordered 400 organs of American and Canadian manufacturers for the public schools of his country, and is soon to order a bigger lot.

—A remarkable reduction in the retail price of cycles has taken place. Certain high-class grades which formerly sold for \$100 will for the future be offered at a considerably lower figure, and it is expected this reduction will affect the wholesale prices.

—A new branch of trade has sprung up in the State of Washington, namely, the exportation of brick to South Africa. Washington clay is excellent for brickmaking, while, in South Africa, the native brick will not stand the weather. The brick is sent in vessels as ballast.

—A committee of German protectionists has petitioned the Foreign Office of the German Government to impose a heavy duty on American cycles. If such a tax is not levied, they say, such is the cheapness and excellence of the American wheels that the native cycle industry will be ruined and 25,000 men thrown out of work.

—Other American specialties which, according to an English newspaper, have a large sale in England are files, tailor's shears and hairclipping machines. Furniture of nearly every description, too, is now going from America to England, while printing machinery, watches and clocks and leather belting are American productions having a well-established place in British trade.

THE Pennsylvania Tube Works Company has closed a contract with the Australian Government, the particulars of which are as follows: One hundred miles of 12 inch lap-welded steel pipe and over 300 miles of 30-inch steel-riveted pipe. The pipe is to be used for the water supply of Koolgardie gold fields in Australia, the work being a government undertaking. Over 20,000 tons of material will be used in the construction of the pipe, and with the rail and steamship freight charges the pipe will cost, it is said, \$2,000,000 by the time it reaches Australia.

THE largest modern gun ever built is now being made for the army. It is a 16-inch breach-loading rifle and will weigh 280,000 pounds. It will be 50 feet long, with a breach diameter of 62 inches and a muzzle diameter of 27 inches. It will carry a charge consisting of a 2,370 pound shell and 1,060 pounds of powder. This shell will have 1,975 foot-seconds muzzle velocity and 64,084 foot-tons muzzle energy. It will be able to pierce a 34 inch steel plate at the muzzle and a 28 inch plate at a distance of 3,500 yards. The gun will be used at one of the coast forts.

A BURLINGTON, Pa., inventor has just completed a novel contrivance in the shape of a cycle on which he expects to be able to ride over the waters. It is said that the machine can make a speed of six miles an hour. It is composed of two metal cylinders to the rear of which are attached paddle wheels, and which are connected by a sprocket wheel and chain communicating with the pedals. A front cylinder connected with the handle bar is used for a steering apparatus, the operator sitting on a seat as in an ordinary bicycle. It is said the machine rides the water easily and the danger of upsetting is remote.

WHEN steel nails first began to meet the iron product the iron nail industry was one of great proportions. The steel cut nail proved a formidable competitor of the iron nail, but soon the wire nail asserted its leadership, and from a position in point of output second to the cut nail it has in five years advanced until there are now four times as many wire nails made as cut nails.

Years.	Cut Nails.	Wire Nails.	Total.
1891 .....	5,002,176	4,114,385	9,116,561
1892 .....	4,507,819	4,719,524	9,227,343
1893 .....	3,048,933	5,095,945	8,144,878
1894 .....	2,425,060	5,681,801	8,106,861
1895 .....	2,129,894	5,841,403	7,971,297
1896 .....	1,615,870	4,719,860	6,335,730

AN expert has contrived the following statement to show the economy effected by labor saving machinery: One man and two boys do the work which it required 1,100 spinners to do but a small number of years ago. One man does the work now of 50 weavers, who were required at the time of his grandfather. Cotton printing machines have replaced 1,500 per cent. of hand labor. One machine, with one man as attendant, manufactures as many horseshoes in one day as it would take 500 men to make in the same time. One nail machine has taken the place of 1,000 men. In the manufacture of paper 95 per cent. of hand labor has been replaced. By the use of machinery in loading and unloading ships one man can perform the labor of 2,000 men working without its aid. Steel ties machinery produces a saving of 500 per cent. Typesetting machines effect an economy of 150 per cent.

THE deployment of American trade beyond its own borders is of an encouraging nature. It is constantly extending its area, and reaching out for the uttermost parts of the earth. The American locomotive glides over the plains of Russia and the hills and valleys of Japan. The American steel rail is spiked to the road beds of China, Russia, Mexico, Argentina, and also in Great Britain and Canada. American mining machinery is found in the diamond fields of

South Africa, and the American plow in the land of the Pharaohs. The mills of New England ship their textile fabrics to the fellahen of Egypt, the ryot of Bengal and the rat eaters of Peking. The American drill bores for oil in Baku, and with American steel the pioneer and explorer cuts through the jungles of the Congo and the forest solitudes of Siberia. The same can be said of nearly every product of American skill, and as we wake up to the importance of foreign trade, and the best methods of securing it, the wider will be its circle.—*The Age of Steel.*

MR. K. WERGENBURG, a representative of a large Swiss manufacturing concern, who has been lately inspecting the products and plants of some of the best New England shops, particularly those of Providence, Hartford, Lowell, Worcester and Boston, states that in machine tool construction America leads the world. "The reason," he says, "why American tools are found to be so satisfactory is that tools are readily evolved. If a piece is found by experience to be too small it is made heavier next time. Tools start at a simple stage, and are gradually evolved, step by step. In this country common sense is applied, and the changes made as a matter of course and without much thought; while a German would spend a long time in figuring out the why and wherefore, and would be distanced by his American competitor. In the greater tasks, however, thorough and complete knowledge of the great principles is necessary. Manufacturing interests are greatly on the increase in Europe, and machine tools are being bought in great quantities. The European markets cannot supply the demand, and the European manufacturer prefers the American product if he can get it."

THE Radatz submarine boat was recently tested at Oshkosh, Wis., and proved a success. The ship is 65 feet long, 4 feet wide and 7½ feet high. It is built of steel plates on a heavy framework of angle irons, with an estimated strength sufficient to withstand safely the pressure due to a submersion to a depth of 500 feet. It carries two sets of propelling machinery, a hot-air engine of 30 horse-power, for use on the surface, and an electric motor, for propulsion beneath the surface. Several trials have demonstrated the capability of the craft to navigate beneath the surface of the water for a day at a stretch with safety. Trials have also shown that the craft can be made to rise and fall in the water at the wish of the operator, and with various velocity. A complete submersion of the boat can be made in eighteen seconds. If it is desired to hold the craft suspended in the water at any desired depth an automatic machine is provided which is capable of maintaining the ship at a given depth for hours at a time, with a variation in depth less than one inch from the given mark, either with the ship in motion or when still. An automatic machine is provided to prevent the submersion of the craft, either by intention or accident, beyond a predetermined depth.

## Novelties in Steelmaking.

SEVERAL new processes having to do with steel and iron making have recently been tested. At Bellaire, O., a test was made of the John B. Hastings process of converting common iron into high-grade steel which is reported to have been a "positive success." Five hundred pounds of iron were treated and converted at a total cost of less than 5 cents. The converter is heated by oil and air, requiring but 2 gallons of oil to obtain the required heat. This was pronounced by those present to be the cheapest and most successful process now known for making steel. There were also made lathe tools, test bars and other articles requiring high-grade steel. The lathe tools were placed in a lathe and put to cutting machine steel shafting. Other articles that were cast were reheated and made into different shapes, proving that steel cast in molds of sand could be made into any shape desired. Then the steel was heated, and it was found that it would stand as much heat as common iron, and a weld was made, and all efforts to break the steel at the weld were unsuccessful. In Chicago a plant is being constructed to work a steel process in which it is proposed to make ingots from scrap or pig iron in a way and under methods which will cheapen the cost of steel by a third. In this process the furnaces can be kept at a temperature of 4,800° for twenty-four hours, if we may trust the claims of its inventors.

THERE are more felt hats being shipped this year abroad than in some years previous. A Poughkeepsie manufacturer remarked recently that American felt hats, which heretofore could not meet European competition in South American countries, are fast gaining a hold on that market. Recently the Argentina and Brazil have proven very good markets. To the latter country upwards of \$7,000 worth has so far this month been shipped, and there are still orders pending which will increase that amount of shipment to a few thousand more before the month closes. It is said that Russia and Japan are also to begin to import American felt hats, and to both countries a number of exporters have recently furnished samples.

A PHILADELPHIA manufacturing concern has just turned out a mammoth flywheel nearly 30 feet in diameter for the Carnegie Steel Works at Homestead, Pa. It weighs a little more than 180,000 pounds, and was made in two sections of 90,000 pounds each. The wheel will go upon a shaft 2½ feet in diameter, resting on 3½-foot bearings, and from a 2,500 horse power engine, built also by this company for the Carnegie Steel Works, this shaft will impart to the great wheel the speed which, when thoroughly developed, will be an ultimate of 4,000 horse-power. The cars used to transfer the wheel to its destination were especially built for the purpose, upon somewhat the same model as the cars which were built for and used in the transfer of the great Krupp gun to the World's Fair in Chicago.



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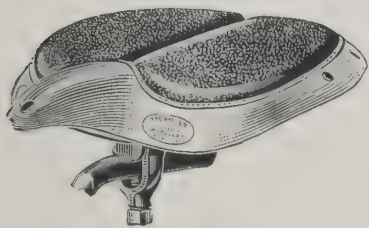


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They are built by the oldest and best-known high-grade bicycle men in America, and the '97 model embodies some new and special features that will fascinate wheelmen and dealers instantly.

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**FRAMES**—22, 24, 26 inches high; seamless steel tubing, large diameter; reinforced joints, 43 inch wheel base.

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**GEAR**—64, 68, 72, 76, 80; forged sprockets, hardened; Cranks, 6½ inch, forged; Chain, ½ inch, hardened.

**FINISH**—Black or colored enamel, highly polished; nickeling done on copper.

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### A New X-Ray Apparatus and Transmitter.

A NEW X-ray apparatus has been invented by Jarvis S. Wight and Prof. Rufus Sheldon, of Brooklyn, N. Y. It is said to have all the advantages and none of the defects of Edison's machine. It was recently tested on a man who had been shot in the thigh. The bullet had entered the thigh in front, about 4 inches above the knee and had finally lodged in the muscles back of the bone. It was surrounded by nerves, which made the operation a very delicate one. With the aid of the new apparatus, however, it was easily performed.

The distinctive feature of the new apparatus is an improved transmitter, by means of which the ordinary electric-light current can be used. This has been very difficult until now, because of the high voltage of the electric-light current. Various devices have been invented to reduce this voltage, but the nearest approach to it was made by Edison.

The secret of the invention lies in the transmitter, and application has already been made to patent it.

Dr. Wight, Jr., claims that it reduces the ordinary electric-light circuit of 110 volts to less than 8 volts. At the same time an amperage of 6 is maintained in an ordinary 6 inch Ruhmkorf coil. A Queens tube is used, together with one of Edison's fluoroscopes. There is also an improved vibrating brake, which gives a very useful secondary current while maintaining a powerful primary current, which is able to give a spark of 8 inches.

### Sorting Steel Balls.

THE sorting of steel balls in the now almost universal ball bearings has made their manufacturing a great industry. Several large factories of this country which originally made a specialty of machine screws are now run exclusively on steel balls of all sizes for bearings. For different uses different degrees of hardness are required, if too soft they will not wear long, while if too hard they are very likely to crack. In order to assort them accurately the following ingenious method has been devised: A glass plate has been inclined slightly from a horizontal position and the balls to be tested are dropped on it one by one from a certain distance above. Several platforms or shelves, inclined like the glass plate are arranged above the plate in front of which the balls drop. The hardest balls, having the most elasticity, bound the highest and furthest, and land on the highest shelf, over which they roll and drop into their proper compartments. Those having a less degree of hardness fall on lower shelves and are thence conducted to different compartments representing each degree of hardness for which the balls are assorted.

### New Autocar Motor.

IT is reported that Prof. Elihu Thomson, the eminent electrician, of Lynn, Mass., has been at work for two or three years past experimenting on a motor to propel carriages. Professor Thompson tried various elements, such as gas and gasoline and various oils, but finally returned to his first love, the electric motor, and while the experiments have been conducted with much secrecy in temporary buildings near the works of the General Electric Company, in Lynn, it is now understood that the perfected electric carriage will shortly be in readiness for public use.

The motors are to be placed on the rear axle of the wagon, and a speed of twenty miles an hour can be easily maintained. The electricity will be supplied from a storage battery of greatly reduced weight.

The motor is light, and the steering attachment is to be connected with the front wheels. Simplicity and durability are the prevailing characteristics of the mechanism. Mr. Lemp assisted Professor Thomson in his experiments.

### Greater than the Niagara Plant.

THE ST. LAWRENCE CONSTRUCTION COMPANY has ordered fifteen 5,000 horse-power generators. They are to be of the same type as those now in use at Niagara Falls. The destination is the Falls of the upper St. Lawrence at Massena, N. Y.

The long-distance transmission will probably be for the cities of Ottawa and Montreal and other centres in that locality.

The plant will be the largest of the kind in the world and nearly twice the size of that at Niagara Falls. The cost of the machines is estimated to be about \$800,000.

The scheme contemplated by the St. Lawrence Construction Company will take advantage of the natural conformation of the land in the vicinity of the Massena to create a waterfall. At that point the St. Lawrence River is about 50 feet higher than the small stream three miles away. The company is digging a canal to connect the two streams. A smaller stream empties into the St. Lawrence a few miles further down, and furnishes a natural outlet for the water of the canal. The company purposes to generate power at a sufficiently low cost to induce manufacturers to establish plants on its property. It is understood that the company is backed entirely by English capital.

—Electrical machinery to the amount of \$200,000 has been exported to Europe by three electrical manufacturers during the month of June with hope of a continued business all Summer. Among other exports are six locomotives for Cape Town, where railroads are rapidly increasing. Many Americans are also going to the same spot to seek their fortunes, as an attractive field is opening for their enterprise.

### Linen Industry in Rhode Island.

THE preparations are nearly completed for beginning the manufacture of linen goods from American flax at Woodville, R. I. This enterprise will attract special attention in the textile world, as its successful issue means the establishing of a new manufacture in this country. There have been previous attempts to establish linen manufacture in the United States, but they have not met with encouraging success.

The company which will operate the mill at Woodville will use American flax. There are thousands of acres of flax raised in Minnesota and Wisconsin for the seed, from which are obtained linseed oil and meal. Heretofore there has been no way of utilizing the straw, all of which has been wasted. The fibre has been considered too coarse and woody to be of value for textile purposes. It will not readily decompose, and so cannot be utilized as fertilizer, and the only way to get rid of it has been to burn it. Thousands of tons have thus been wasted every year.

The Miller patent process, which is controlled by the company at Woodville, extracts the flax from the woody fibre of the straw and gets a valuable product from what was formerly waste material. There is an abundant supply of straw, and its first cost is comparatively small, as the growers, after getting the seed, are only too glad to have the straw taken off their hands.

The company has an extracting plant at St. Paul, Minn., where the first process is done. The flax, as extracted from the straw, will be shipped in bales to Woodville, where the carding, spinning and weaving will be done. It is proposed to at first make crash towels. Later on, as the hands become more skilled and as the machinery is perfected, the manufacture of finer goods may be undertaken.

The company is organizing under New York laws and the principal men in it are New Yorkers. A good deal of preliminary work, including the selection of a site, the building of special machinery, etc., has already been done. Woodville was selected as the site of the plant for several reasons. The water power is abundant and help can be easily obtained in the vicinity. These are important considerations. Help of ordinary skill, who are familiar with cotton or woollen manufacture, can do the work required. It is not expected that a very large force will be employed at first, but later on, if the venture proves the success which is expected and hoped, the plant will be increased. Mr. L. I. Merritt is the representative of the company at Woodville.—*Hope Valley Advertiser*.

### Electrical Power Transmission.

ARRANGEMENTS have been made for the greatest undertaking in the matter of electrical power transmission that has ever been tried. The power is that of the river running through Santa Ana Cañon, and it is to be used in the towns of Los Angeles and Pasadena. The amount of power to be transmitted at first is 4,000 horse-power. The station will be in the Santa Ana Cañon, twelve miles from Redlands and about eighty miles from the towns in which the power will be utilized.

The water will be taken from the river by canal, flume and tunnel along the side of the cañon; then it will be led into a pipe line 2,200 feet long, giving what will be equivalent to a vertical fall in the water of 750 feet.

Thirty-six miles from the waters of the Ogden Cañon in Utah to Salt Lake City is the greatest distance over which power has as yet been transmitted. The distance from Niagara to Buffalo, the furthest point to which has been transmitted the power of Niagara, is 26 miles.

### Substitute for Lath and Plaster.

A FACTORY at Minneapolis, Minn., uses up the rough and practically waste product of the saw mill in the production of a "compo board," which is said to be in many respects superior to lath and plaster in the construction of inside walls. One-inch boards are ripped into strips one quarter of an inch in thickness and four feet in length. It takes but a short time to thoroughly dry all the moisture from these strips, which are fed through a machine in which, as they lie solidly edge to edge, they are covered top and bottom with a strong and specially prepared building paper, which is cemented by an insoluble cement, and without further manipulation is ready to be nailed upon the studding of a building, forming a solid wall upon which the paper hanger may ply his decorative art to his heart's content. This "compo" paper is handled by the carpenter rather than the plasterer and forms a satisfactory sheathing, not only air-tight, but stiff and strong enough to take the place of lath or boarding while enabling the complete finish of the walls without the delay and muss of ordinary plaster.

IN the last ten years the exports of agricultural implements have increased from \$2,367,258 to \$5,176,775. Books, maps, engravings and other printed matter show an increase from \$1,314,639 to \$2,338,722; carriages, cars, etc., have increased from \$1,927,888 to \$2,887,598. The exports of clocks and watches were but little more in 1896 than in 1886, but jewelry has come up from \$385,411 to \$802,179, while instruments and apparatus for scientific purposes of which there were exported in 1886 only \$479,586, figure, in the exports of 1896 for \$2,522,217. The exports of fertilizers have grown from \$1,107,657 in 1886 to \$4,400,593 in 1896. The manufactures of india rubber and gutta percha figure in 1886 for \$664,304, and in 1896 for \$1,858,556. Under the head of naval stores, consisting chiefly of rosin, there has been an increase from \$2,032,298 in 1886 to \$4,229,735 in 1896. In paper and its manufactures the increase has been from \$1,106,616 in 1886 to \$2,713,875 in 1896.



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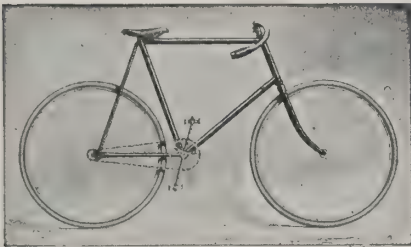
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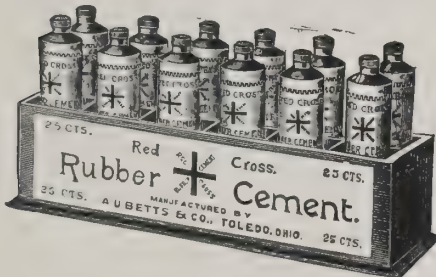
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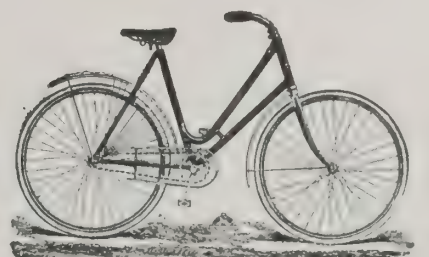
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**STANDARD BICYCLE MFG. CO., 71 Jackson Blvd., Chicago, Ill., U. S. A.**



### Inventions.

A RECENTLY incorporated match company of New Jersey controls an invention for the quick and cheap manufacture of matches. The machine is said to be a marvel in its way, making, boxing and labelling all at the same time. The company will do business in all quarters of the world, and will manufacture and sell matchmaking machines.

IN a new self-waiting table patented by Charles Boyd, of Centerburg, O., the outer top is cut away in the centre, which is occupied by a rotary top by which the dishes may be revolved to any portion of the table desired. A circular rack prevents the dishes from falling, and a catch is attached to each seat at the table by which the rotatable top can be fastened in position at will.

RICHARD KING, superintendent of the steel works in Belleville, Ill., U. S. A., has invented and patented a new process for annealing castings, which, it is claimed, will revolutionize the iron and steel industry. Mr. King says with his process the cost can be cut in two. He exhibited his work to a number of iron and steel men at Belleville and they told him his discovery was one of the most important in the history of iron manufacture. Mr. King has applied for letters patent in all foreign countries where iron is manufactured.

CHARLES N. STANTON, of Collins, Ia., has made an invention for ventilating and lighting cellars. To the upper part of the wall is fastened a perforated induction tube which may, if desired, extend entirely around the cellar. An open-ended tube at one end of the induction tube conveys the foul air to the chimney, the draught thus sucking the impure air continually through the perforations in the induction tube. A sheet-metal case with glass sides contains a lamp which lights and, when desired, warms the cellar, the top of the heater being connected with the induction tube, and by closing a damper in the tube the outflow of air from the cellar is prevented and the heat retained.

LETTERS PATENT have been granted to Jos. Leach for an invention which provides means whereby the hoops of tubs, barrels and similar articles may be secured so they will not drop off when loosened by the shrinking of the staves, and a fastening that will permit the hoops to be tightened by driving them on further when they become loose without the necessity of removing the fastening. When the hoop becomes loosened by the shrinking of the staves the fastener will hold the hoop up in position and, the widest dimension of the spurs being in the direction of the grain of the wood in the stave, will enable the hoop to be driven more tightly onto the barrel without removing the fastener, because the spurs will be able to separate the grain of the stave.

A DOUBLE-DECKED car has been devised for use on an American line. The car is made of a steel skeleton construction, which makes it stronger, lighter and cheaper than other cars; that is, cheaper per seating capacity. Moreover, it meets the demand for large seating capacity in street railway cars, at the same time occupying no more road space on crowded streets than an ordinary car. It is a two-decked, centre vestibule car, has no platforms, the ends being semicircular in shape and closed, and the entire space is utilized for seats. There are two central entrances, so that loading and unloading can be done more quickly, the passengers not having so far to go to reach the door in getting off. The roads using this car only require one equipment for Winter and Summer. The motorman is located on the top deck in the front portion of the car.

THE invention of a simple and inexpensive device for accelerating the speed of ships and preventing barnacles and corrosion has been brought to the attention of the Navy Department. The invention consists of a mechanism which envelops the submerged portion of a ship with a film of oil, thus reducing friction and overcoming to a large degree the resistance of the water. In flanges fastened along the bottom and sides of the ship below the water line are sheets of woven-wire netting, covered with an absorbent composition saturated with oil. A fine spray of oil, projected against these flanges, spreads over the sheets and then downward. It is not carried away by the water, but keeps the ship's hull greased without any waste. The claim made for the composition is that it is a perfect carrier of oil under the surface of the water, a feature which has never before been achieved, and which will make oil perform below the water line the same service that it does in quelling a rough sea. It is said that the invention will increase the speed of any vessel, either steam or sailing, by at least 25 per cent.

DR. R. B. JOHNSTONE of Chicago has invented a submarine shell which is to be submitted to tests by the Navy Department that will decide as to its ultimate adoption by the Government, to which the doctor intends to present drawings of his invention. He will leave it entirely with Congress to decide whether his services will be recognized by any compensation. Other shells explode by concussion, and if they fall ever so little short of the mark they sink useless, and hundreds of dollars are wasted. With the Johnstone torpedo the shell explodes as soon as water touches the chemical of the peculiar cartridge, and the dynamite which it contains will cause a destructive explosion, which will reach a vessel within several hundred yards. It can as well be dropped from a balloon as fired from a gun. The cartridge can be so timed as to explode at any desired depth from 1 inch to 15 feet below the water line. While the cost of torpedoes now in use is great, the Johnstone can be manufactured at small expense from glass, iron or cast steel in any shape desired. It may be fired from a pneumatic gun, and a tiny tug carrying a cargo of these shells could, if they are all that is claimed, exterminate the fleets of the world.

### A Bicycle Airship.

WILLIAM STEWART, of St Louis, Mo., an inventor, has completed the airship upon which he has been working for two years, and the machine is about ready to sail. Associated with him are his brothers, Charles and Dr. Wellington Adams, the noted electrician and inventor.

The machine weighs about 600 pounds and is adapted to two persons. The occupants furnish the motive power with their feet after the manner of pedalling a bicycle. They occupy seats attached to the iron framework or car of the boat. Attached to the pedals is an endless chain which operates the propellers, wings and rudders. The person seated at the front of the car causes the aeroplanes on top of the ship to revolve and lift it in the air. A lever near at hand serves to operate the rudder and sail. The second occupant furnishes the power to turn the propelling wheel.

The canvas above the car is inflated with gas sufficient to overcome the weight of the entire machine, so that the lifting force will be no greater than that expended in riding a bicycle over the ground. The balloon portion is concave, so that a balance may be the better obtained. The rudder is in front instead of the rear and is manipulated, Mr. Stewart says, on the principle that birds use in changing their course.

The ship is 75 feet long, 26 feet from the bottom of the car to the wing on the top and about 6 feet wide.

### Welsbach Mantles.

WALDRON SHAPLEIGH, chemical engineer of the Welsbach Light Company, delivered an address at a recent meeting of the Franklin Institute of Philadelphia, describing the manufacture of the mantles which produce the light by their incandescence. The light, as is well-known, is given off from a substance which is heated white hot by the burning gas. The mystery has been that this mantle is not consumed by the heat and oxygen of the air, as iron or any other metal would be. The mineral from which these mantles are constructed is called monazite. A few years ago it was but little known and was extremely scarce. The demand for it has stimulated discovery, and at present 2,000,000 pounds and over are used annually. A mine of it has been found in North Carolina. It is a combination of several elements, of which thorium is the most pronounced in light-giving. Among these elements are yttria, erbia, lanthana, ceria, lanthemia and didymia, all of which were but a few years ago unknown to chemists. The metal is infusible and unoxidizable, and if no dust should settle upon it would be practically indestructible. The mantle is formed by permitting the metal in solution to deposit upon a silk mantle, then burning away the silk.

### New Building Material.

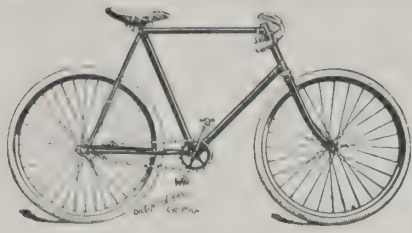
A NEW building material is proposed by a Boston inventor, one of the prominent advantages of which for building purposes is its fireproof quality. It is described in the *Herald* of that city as a combination of pulverized stone, coal cinders, sawdust, or other substances, with magnesia, and two chemicals which are not made known. It is run into molds when in a semi-liquid state and hardens in twenty four hours, there being no burning, as with clay products, the set being a chemical one. Various substances may be used as the base of the compound. Pulverized marble chips yield a product to all appearances like natural marble, with the crystalline formation and texture of that stone; and when poured on plate glass a good polish is obtained without further treatment, and by the use of polished brass molds different shapes may be obtained. For fireproofing blocks and bricks, coal cinders ground quite fine, with a small amount of sawdust, are employed; these fireproofing blocks are claimed to be one third lighter than those of terra cotta of the same size, while the cost is reduced to nearly one half that of the latter; and the new material being lighter, the space between floor beams may be further and the steel frame of the building lighter, thus reducing the material required very considerably.

### A New Floor Mosaic.

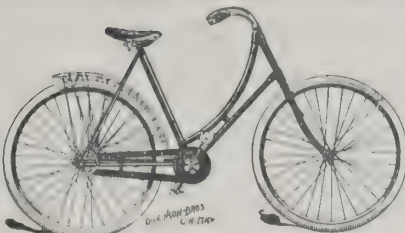
IN the reports of the *Industrial Union* mention is made of a new process of floor mosaic, says the *Gale Scientific Monthly*. Small particles of wood, as sawdust, wood flour and fine shavings, are treated first with a mixture of shellac and alcohol, and then with a cement made of curd and slacked lime. While this mixture is still damp it is put into hot molds of the desired shape and size and placed under pressure. The joint action of the heat and pressure unites the wood most thoroughly with both the shellac and the cement. After a few minutes the compound is taken out of the molds, when it is thoroughly cooled and hardened. Great care is necessary that no foreign substances, especially of an oily nature be present, as it would prevent the cement from being absorbed into the pores of the wood. In making different colored mosaic the natural color of the woods used is taken into consideration, then the wood itself is dyed, and lastly, dyes dissolved in alcohol are mixed with the shellac. The process is then performed as before. In spite of its hardness this compound possesses all the perfection of wood, so that it is particularly well adapted for use as a floor covering in living rooms or private dwellings. An important advantage over all other processes of manufacturing mosaic floors is, that it is not affected by any change of temperature.

—A special service for conveying California fruit across the Continent has been inaugurated. By its means the fruit will reach London in twelve days, and so arrive fresh in that market.





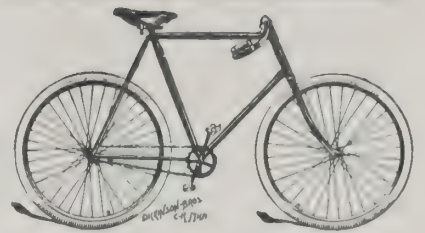
Halladay Roadster, \$100. Discount, 45 per cent.



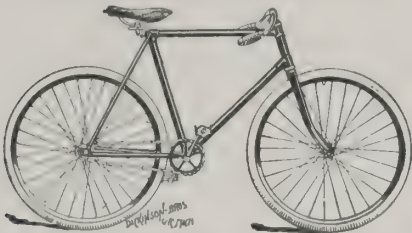
Lady Halladay, \$100. Discount, 45 per cent.



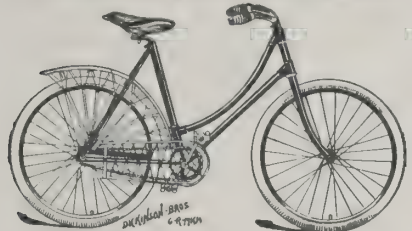
Lady Aetna, \$75. Discount, 50-5 per cent.



Aetna Roadster, \$75. Discount, 50-5 per cent.



26-inch Boys' Aetna, \$50. Discount, 40 per cent.



24-inch Girls' Aetna, \$40. Discount, 35 per cent.

## MARION CYCLE COMPANY,

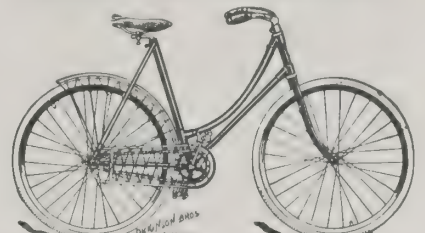
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The Largest and Most Complete Line of Bicycles  
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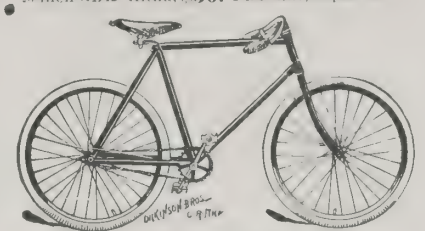
# Halladay AND Aetna Bicycles.

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Absolutely Guaranteed.

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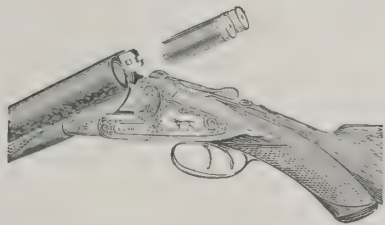
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NITRO POWDER.



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8, 10, 12 and 16 Gauges.  
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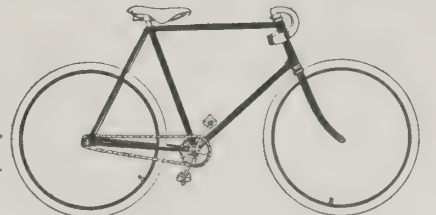
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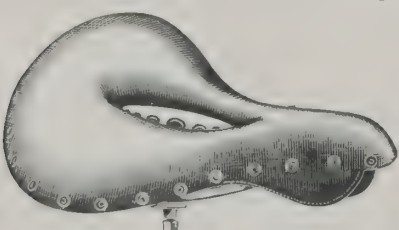
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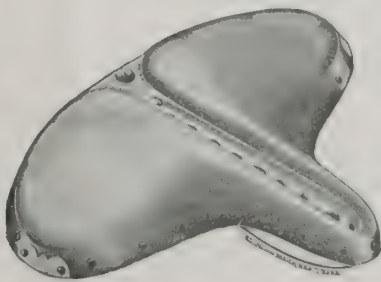
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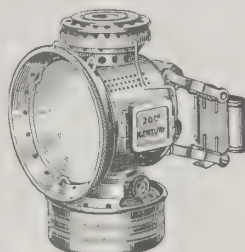


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Lighted. Greatest Light  
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POPULAR ALL OVER THE WORLD.

BICYCLE HEADLIGHT, with detachable Bicycle Holder, re-  
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Including one attachment, either Bicycle or Dashboard, gossamer  
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Nickel - \$3.00  
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## THE TANDEM SIZE AS A DRIVING LAMP,

with detachable carriage attachment, can  
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tached and the ball handle raised the 20th  
Century makes a most excellent Hand  
Lantern for the house, barn, country road,  
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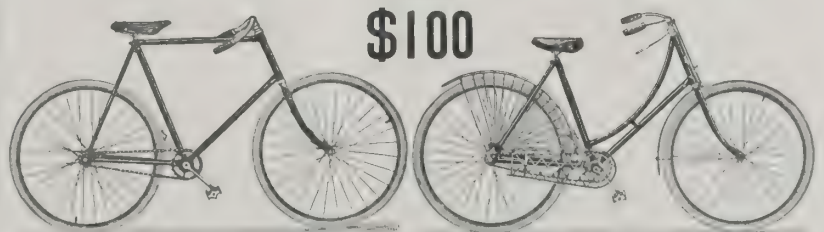


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## TRIBUNE BICYCLES.

PRICE,

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The Best Wheels in the World!

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### The Wonders of Pulp Wood.

THE announcement made recently in England and in France that the discovery of a process for the manufacture of silk directly from wood pulp has proven an unquestionable commercial success means not only that the silk worm industry, as well as the silkworm itself, is doomed, but it marks the latest step in that wonderful advance, within the last ten years, in the use of wood pulp as a material for manufacture. Very few people probably are aware of the varied uses to which this product, technically known as "cellulose," is now put—that from it now comes the larger part of the paper which we now use, and also many of the car wheels of the coaches upon which we ride, and rails for railways, and wagon wheels, and horseshoes, imitation porcelain ware, barrels, boats, window panes, furniture of many kinds, telegraph poles, drain pipes, and tiling, paving brick, coffins, carpets, thread, heavy guns, matches, portable houses, paint, artificial teeth, and even bicycle frames.

And still those engaged in the industry regard it as yet in the stage of short dresses. The latest application, to the manufacture of silk, seems to confirm this view. Almost all the uses of cellulose, indeed, aside from that for paper-making, have come within the last ten years, and probably the last year has seen more new uses made of this remarkable substance than in all the other ten put together. New patents are being taken out every month, and with the enormous extension that will be made by the invasion of the vast spruce and fir forests of the North Pacific coast in this country and of Siberia it is entirely probable that the next few years will witness a still more remarkable advance.

Paper is now only one of the countless forms in which wood pulp or wood fibre is now made up. Probably the next and most important employment is that for car wheels. These are, as a rule, made from straw pulp and directly from strawboard. A solid disk or wheel made up of a number of layers, much in the same way as calendar rolls are made, is forced under strong pressure into a steel tire. Then into the centre of this disk an axle box is thrust, under similar pressure. When first the strawboard disks are put together they are thrust under a hydraulic weight of 8,000 kilograms for an hour, and a pressure of 90 to 120 tons is employed in fitting the tires. In this way a wheel is made that is about three times as durable as those made of steel, and, furthermore, far more elastic.

This elasticity not only greatly increases ease of railway travel, but it diminishes the vibrations of the axle and bearings, the effect of these vibrations being to crystallize iron or steel, where the wheel is made of these latter substances. At Pullman, Ill., the chief seat of manufacture in this country, a pair of paper wheels have a record run of almost 1,500,000 miles, a record which is exceptional for any kind of metal.

This same wonderful hardness which is obtainable with paper has very recently been turned to account in Berlin, Germany, in the making of paving brick. These latter are made from ordinary wood or straw pulp, to which sulphate of zinc is added as a preservative. The material being thoroughly mixed, it is put into a vat, where other chemicals are added, and then subjected to a pressure of 2,000 to a square inch. The bricks thus formed are placed in a kiln and baked for 48 hours, much as bricks of clay. These wood-pulp bricks weigh about 3 pounds, where those of the same size of clay weigh 10 pounds, and are practically indestructible. Under this same process conduits for the use of electric or telephone cables are now being made, and drain tiling as well. Among the advantages claimed for the latter is its exceeding hardness, its light weight, its nonconductivity of heat or sound, and sufficient elasticity to meet all requirements. The dampness experienced usually in the case of stone is also absent, and in price and appearance the tiling takes rank over that made of clay. Similarly a dentist in Lubeck is a maker of paper or wood-pulp teeth, said to be of fine quality.

A slightly different process is employed in the manufacture of wood pulp screws. These are usually of the larger size, and are made from a compound of fine pulp, clay, alkali, soda and glue. After casting—or, rather, pressing—the threads are cut and the stock then treated to a bath of sulphate of copper. An oil varnish finish completes the work, and a tough, elastic screw, valuable for various uses, is the result.

Yet another successful application of this curious substance is in the manufacture of telegraph poles. The latter are hollow and very much lighter than those that are made of wood; they are stronger and are said to be unaffected by sun, rain, or any other causes which shorten the life of the ordinary wooden pole. The pulp is cast in a mold with a core in the centre, forming a tube of the desired length. Coffins, too, are now made in Europe of wood pulp which are susceptible of a high polish, look as well as the finest woods, and are much less expensive. Still another German genius has constructed a good sized cannon out of pulp, it having a steel core and the exterior being bound by five layers of metal wire. It is far lighter than a steel gun, and is likewise said to be much stronger than a similar thickness of metal. Not to be behind the times a Chicago genius has constructed a bicycle frame entirely of wood pulp, and would like to start a factory for the manufacture of paper bikes. Bicycle handles made out of blotting paper, which in turn comes from pulp, are now not uncommon.

Every one is familiar with paper matches, which have come into general use. Strips of paper, about half an inch wide, are first drawn through a combustible vat, and are then by machinery turned into long, thin stems. These are cut into the right lengths and the heads dipped into a solution of phosphorus wax and dried. Paper matches are cheaper to make than those of wood, and within a few years this industry has assumed such proportions that it is not impossible that the familiar wooden match will become a thing of the past.

In its victorious advance wood pulp now threatens to invade the cloth and

leather industries, as it has that of paper, steel and others. A Frenchman named Claviez has invented a process for making paper thread. Before being cut in strips the paper is steeped in certain chemicals which give it tenacity and ductility, and it is then wound on bobbins and twisted into threads, and afterwards passed through a pair of cylinders to coat it and give it a glossy appearance. This thread, the inventor claims, can be worked up into fabrics of various kinds and put to the ordinary uses. Still another Frenchman has found a way to make excellent sailcloth out of pulp, and another genius makes a very good grade of carpet lining, which furnishes a mothproof and elastic foundation for the carpet. Yet another inventor, of Vienna, has found a process for the manufacture of artificial leather from red beech, and claims that a sole leather can thus be obtained superior to animal leather in firmness and durability.

Two English chemists have discovered a way to make a waterproof paint of wood pulp, which is sprayed over buildings, ships and the like. The process is simple and inexpensive, and for painting large surfaces much is expected of it. Still again a Frenchman has found a way to make paper bags that are impervious to water, and a Berlin inventor has produced a fireproof paper, thin and of good quality. For that matter not long ago a wood-pulp works constructed a stove out of paper which answered every purpose as if it had been made of iron. It was, however, purely an experiment. Paper window panes were made several years ago in this country and these have latterly been much improved on in France. They have the appearance of milky glass and are admirable for greenhouse use. In the latter country, too, portable houses are now made of wood pulp very successfully and a good grade of pulleys as well. Paper boats, and especially paper canoes, are not new at all, but they have not come into general use as it was expected a few years ago that they would. Paper cuspidors, however, are to be found everywhere and pails, flower pots and similar are now in common use. Paper furniture, tables and chairs and the like are as yet a novelty; so, too, a imitation porcelain ware, paper barrels, wagon wheels, horseshoes and the like. But all of these are probably made in a small way and indicate possibilities in the future. The latest advance in the art, that of silk making, can now be said to be successful beyond question of a doubt. Artificial silk is being made in considerable quantities by two English mills and by several others in France. There is really nothing so very wonderful about it, since it is simply doing mechanically and chemically what the silkworm does.—*Wood Pulp News*.

### Export Shipments.

—The Waterloo Organ Company, of Waterloo, N. Y., recently shipped a dozen organs to London.

—An order for 7,500 tons of steel rails for a railway in British India has been received by the Maryland Steel Company.

—The exports of refrigerators to Russia are rapidly increasing. Large quantities have recently been shipped from various ports.

—The Davis & Egan Machine Tool Company of Chicago has received orders for \$30,000 from Antwerp, Stockholm and Copenhagen.

—The Akron Belting Company, of Akron, O., recently shipped to Egypt 8,500 feet of single and double belting, to be used on cotton gins.

—A carload of California redwood has been shipped to Germany for the manufacture of lead pencils, which is so rapidly increasing that Europe cannot furnish a supply of wood.

—Twelve narrow-gauge passenger locomotives have been ordered from the Schenectady Locomotive Works for the Kinsiu Railroad Company, Japan. It is probable that the order will be followed by one for 68 more locomotives.

—The Delaware Iron Works of Newcastle will shortly have 100 tons of trolley and telegraph iron poles for North and South Africa. Two hundred tons of these poles were recently shipped by this concern to Cairo and Cape Town.

—Some unusually heavy shipments in certain classes of merchandise have recently been made to Guayaquil. The steamer Finance carried 36 cases of fire hose, valued at about \$7,000; electrical material about \$4,000 worth, and druggists' sundries upward of \$2,000 worth.

—Three American-made bicycles were recently shipped to Tarragona, a walled seaport city of Spain, 52 miles distant from Barcelona. As Tarragona, which is a city of 18,000 inhabitants, is built upon the side of a steep, sloping hill the bicycles can only be used on the cross streets.

—The Edward P. Allis Company, of Milwaukee, Wis., who have in the past enjoyed a good business in South Africa, have been feeling the depressed condition of trade in that far-away country, but have lately secured several satisfactory orders. They made a shipment recently of one 3,000 horse-power Reynolds Corliss type engine, and will very soon forward two more 500 horse-power of the same type that they now have in process of construction.

—American stoves, which are claimed by many to be the best in the world for their utility, style and finish, are exported to many parts of the world. Those exported are mostly cooking stoves and ranges. They are sent in considerable numbers to Australia and also to South Africa. Some stoves are sent to the United Kingdom, outside of England, and to Germany, and to Russia and Turkey; and occasionally to China and Japan and to various Spanish American countries. There is now some foreign demand for American gas and gasoline stoves.





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Discount, 50 per cent. F. O. B. New York. Orders accepted through reliable Commission Houses. Always mail copy of order direct to us. Direct order must be accompanied by cash.

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Can be readily attached to, or taken from, any bicycle. Does not interfere with rider. Adjustable for children of all ages.

Retail Price, \$2.50.

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Tool Bag.

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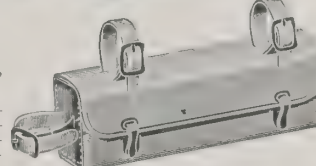
Manufacturer and  
Exporter ofBicycle  
Saddle Leathers.Bicycle  
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# HIGH-GRADE LEATHERS FOR EXPORT.

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A very soft leather in unadorned colors, peculiarly adapted for wear in warm countries.

Both of the above leathers are especially suited for shoemakers in the Colonies and Mexico. Send for full information direct or through your commission house

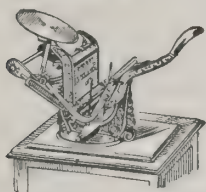
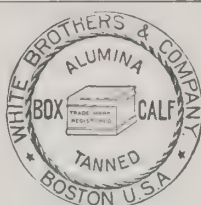
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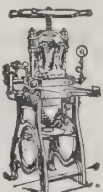
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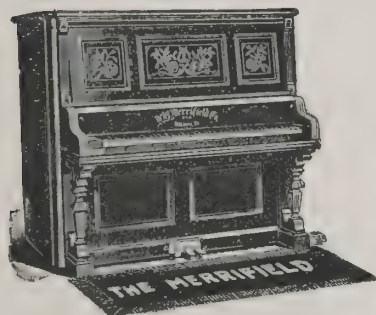
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STEEL AND BRASS DIES FOR ALL PURPOSES.

ALL TOOLS AND SUPPLIES FOR STAMPS AND STENCILS.

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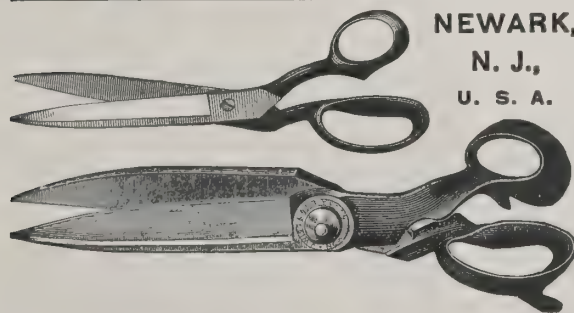
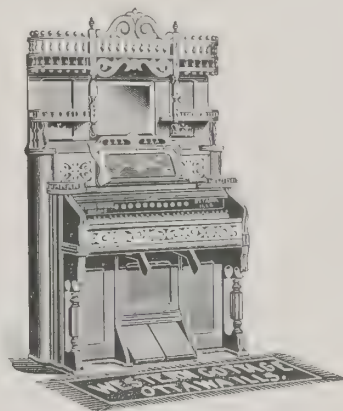
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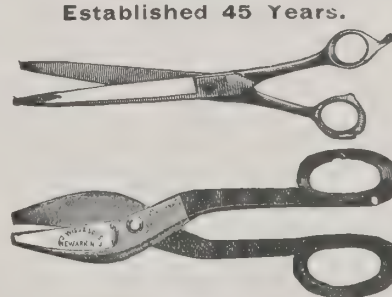
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Manufacture the Largest Assortment of ONLY THE  
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# Shears AND Scissors,

STRAIGHT AND BENT TRIMMERS,  
TAILOR SHEARS, BARBERS' SHEARS, TIN OR METAL  
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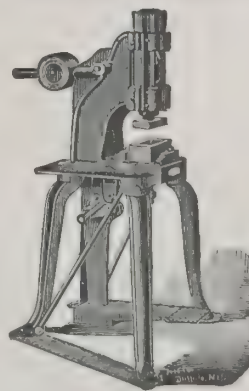


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## Miscellaneous Notes.

—The Berlin Mills Company, of Portland, Me., will shortly send a large consignment of spool wood to Scotland.

—An electric street railway is proposed to be installed at Ghent, Belgium, and United States Consul Morris has forwarded plans and specifications to Washington.

—A company called La Société d'Eclairage Electrique de St. Petersburg has been chartered in Brussels for the purpose of lighting the public streets of St. Petersburg and will need machinery.

—A special dispatch from Odessa says that the Russian authorities greatly fancy the American rifles and have ordered, or are about to order, 50,000 from a sample which has an unusually heavy stock and short barrel.

—It is reported that the Union Iron Works of San Francisco recently shipped nine steel barges to Russia. They are to be used for the navigation of Siberian rivers in connection with the construction of the Trans-Siberian Railway.

—The comparative statements of imports and exports for May show gratifying increases in many lines of trade. Domestic merchandise exported amounted in value to \$76,302,082, a gain of about \$12,000,000 over the corresponding period last year.

—A new process invented by C. F. Stanton, of Mobile, Ala., for making steel from red hematite ore on one run has been successfully tried. The steel is said to be fine grade, and the process renders unnecessary the use of expensive machinery and Cuban magnetic ore.

—A Petoskey, Mich., firm recently filled an English order which called for 100,000 feet of 1½-inch maple flooring, in pieces 3x9 inches on the face, and dovetailed on the under side to meet the peculiar requirements of the foreign buyer—certainly a novelty in flooring.

—A. Jackson, of Tecumseh, Mich., has a novel, if not original, method of making market baskets. He shaves the splints off the edge of a pine plank with a knife closely resembling a patent safety razor. An ordinary plank affords material for a couple of hundred baskets.

—Outside one of the largest shoe stores in London is the sign "American shoes only." Within six months three complete shoe factories, equipped even to the steam pipe for heating, have been sent there from Boston. A few years ago American shoes could not be obtained in London, but now the Englishman wears them.

—McLean & Ockley, one of the largest bicycle firms in Canada, with headquarters at Toronto, have decided to close out their business, the reason given being that breaks in the prices of high-grade United States wheels will prevent their firm from continuing manufacturing at a profit. It is said that several other Canadian firms will follow their example.

—Constantin Chiru, Director General of Posts and Telegraphs of Roumania, has been commissioned by the Minister of Agriculture of his country to look up farming implements in New York and elsewhere with a view of making purchases for shipments to that country. He will thoroughly study up the matter at other large cities and manufacturing plants before making a report.

—There is said to be a large profit in the manufacture of wood alcohol, which is largely used in varnishes and in the manufacture of hats. It is not so good as grain alcohol, but as it costs only about a third as much it always finds buyers. There is now produced annually between \$1,500,000 and \$2,000,000 worth of it in the United States. It promises to develop into a big industry.

—A contract has just been closed for 25 miles of railroad in Corea, from Seoul to Chemulpo, the rails for which are to be made by the Illinois Steel Company. This will take about 2,500 tons of rails, and the order, it is said, may be increased considerably later. The Universal Construction Company, of Chicago, is reported to have taken the contract for the bridge, 1,650 feet long, on the line of this railroad over the Hau River. All the material for the bridge will be rolled by the Illinois Steel Company.

IT is expected that this year the spool timber export trade will break all previous records. Five large steamers have been chartered for the shipment of white birch from Maine for the Scottish thread mills. Besides these steamers, there are several more to carry deals and also some to carry wood pulp to Germany. The largest cargo of lumber sent out of the Penobscot River via Bangor was reported having left on the 24th ult. It consisted of about 2,600,000 feet of spruce deal, bound for Liverpool and other British ports on the steamer Jacob Bright.

ALCOHOL is now being shipped to Japan under circumstances which promise that the American article will be able to come into profitable competition with the German product, which now has almost a monopoly of the trade, as with the advantage of an export bounty it has been laid down at rates that could not be met by the makers of American corn spirits. Recently, however, reduced transportation rates have been obtained making it possible to ship alcohol to Yokohama from Peria at a profit. Thus far three carloads have been forwarded to their destination. This is expected to be the opening of a trade which amounts to millions annually.

SOME recent shipments from the port of New York have been: By ship W. H. Smith, 223 tons of pig iron for Yokohama; by the steamer Cacique, for Peruvian and Chilean ports, upward of \$20,000 worth of mining machinery for Peru; by the steamer Pennsylvania, 481 packages bicycles valued at \$34,600, 431 cases sewing machines valued at \$11,000, 881 packages mowers and reapers

valued at \$12,500, 314 horses valued at \$47,100, etc.; by the steamer Mount Sephar, for Cape Town, Port Elizabeth, etc., hardware valued at \$10,127, manufactures of iron \$16,921, carriages and carriage material \$5,400, plows \$2,220, cigarettes \$18,525, mining machinery \$12,200, bicycles \$2,424, electrical material \$2,588, also a quantity of agricultural and other machinery.

ACCORDING to the report of the United States Consul-General at Melbourne, the Australian importation of American goods is rapidly increasing. In the ten months ending with last April we sold British Australasia \$15,054,298 worth of goods. This showing, though for only ten months, exceeds that of any previous twelve months, the nearest approach being in 1896, when the figures were \$12,748,074. The superiority and excellence of American manufactures, he says, have been recognized, and whenever the duty does not actually prohibit, the tendency has been to purchase them. The Consul-General goes on to tell us that carriage wood ware imported from the United States is acknowledged to be the best. American tobaccos have a large sale. American bicycles, represented already by thirty-eight different makes, are rapidly growing in favor, on account of their combination of strength and lightness.

ACCORDING to a recent report of the British Consul at New York, the American exports to South Africa are increasing at the rate of 100 per cent. yearly. The increase began in 1892. In 1895 the exports amounted to \$1,000,000, while those of 1896 are about \$2,000,000. No regular lines exist between the two countries, but American firms now send from three to four steamers a month to South Africa, when as formerly the trade was dependent on sailing vessels. Large quantities of bicycles, patent medicines, furniture and farm implements have been sent out there lately, and as regards farm implements, some of the older patterns which had become difficult to sell here, in consequence of recent inventions, are said to have found a ready market. There is also a large export of hardware, doors, sashes, blinds, castings, etc., and, in fact, the cargoes sent out present a wonderful variety of goods.

THE end is near at hand of the most remarkable year which the country has ever known in foreign commerce. The figures of our exports for the eleven months up to June show that the total value of the merchandise sent abroad during the record twelvemonth, 1891-2, is to be far exceeded in 1896-7. In spite of low prices, the amount which the trade will reach will place \$1,000,000,000 and something over on the debit side of our commercial bookkeeping. For 1891-2 the exact total was \$1,015,732,011, omitting gold and silver ore and foreign imports resold. At the rate at which the same class of merchandise has been leaving these shores for the last few months the current month should raise the total for 1896-7 to at least \$1,050,000,000. There is one fact, too, which adds a deal of significance to this wide difference in those two immense totals. That is, in 1891-2 grain to the value of nearly \$100,000,000 more than the estimate for the current fiscal year formed a part of the exports of that period.

PROMINENT among the items of the export trade of United States ports is the increasing sale of paper. It is being shipped in large quantities to Australia, to various points in Europe and to Great Britain. The facts seem to be that while foreign mills have not increased in production the demand for certain grades of paper have enlarged, in consequence of which a requisition has been made upon the American manufacturer. The European manufacturer of paper is at a disadvantage in competing with the American, inasmuch as here wood pulp is more abundant and water power more available. These conditions place restrictions upon the foreign manufacturers which they cannot meet. In consequence their output is necessarily limited and prices have to be sacrificed. This gives the American and Canadian papermakers control of the world's markets, and the indications are that the business of paper production for the manufacture of books and periodicals is necessarily coming to the United States.

## American Butter.

A DISPATCH from Washington states that, finding it difficult to get an unprejudiced and definite comparison made in London between butter sent there by the United States Department of Agriculture with the best products of other countries, Secretary Wilson directed his agent at London to buy representative packages of fine butter from various sources and send them in cold storage to New York. These foreign butters were last week critically examined by the leading butter merchants of New York and compared with packages made at creameries in Minnesota and Massachusetts. The samples were scored by Butter Inspector Healy of the New York Mercantile Exchange. On a scale of 100 points the Minnesota creamery was marked 96½; the "Royal Danish" 95 and the Massachusetts butter 94. The fresh Brittany rolls were also placed at 96½. The other samples were marked at 90 and below. The only ones marked perfect in grain, texture or "body" were those from Minnesota, Denmark and Brittany. This judgment was concurred in by a majority of the merchants who examined the samples. Several English merchants were also present. They agreed that the Danish and French samples were fully up to the standard, and that the American samples shown were quite equal to these and in some respects superior. The dispatch adds that this, Secretary Wilson believes, is a very conclusive demonstration that we can make in this country as fine butter as is produced anywhere, and much better than most of that which Great Britain depends upon. Any gentleman who is inclined to disagree with the Secretary now has the floor. The chances are, however, that the floor will not be taken.—*Rochester Post.*





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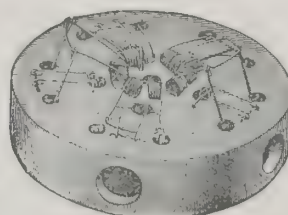
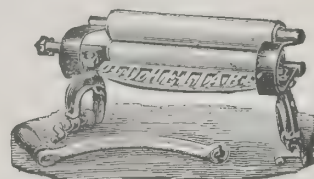
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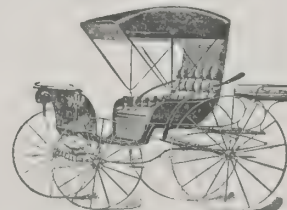
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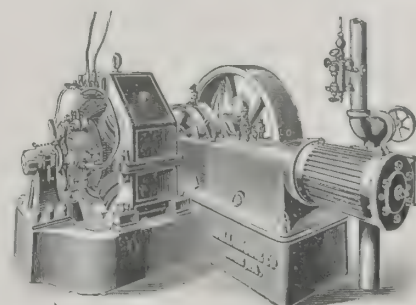
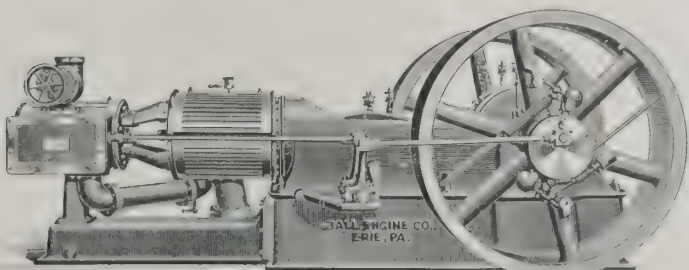
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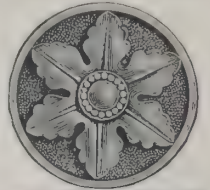
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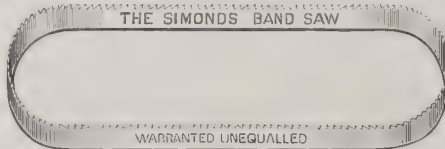
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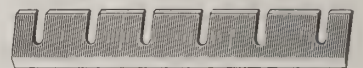
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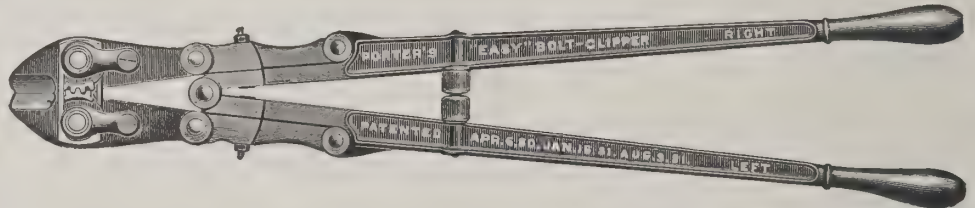
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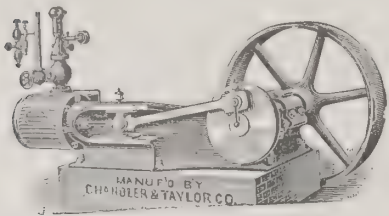
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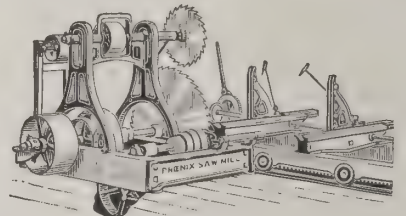
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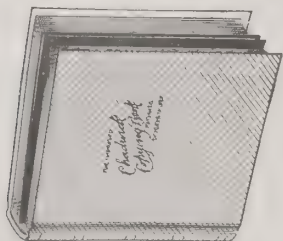
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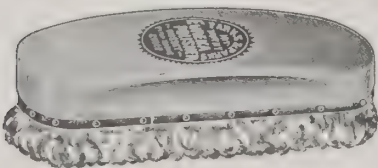
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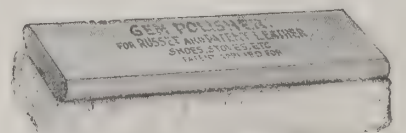


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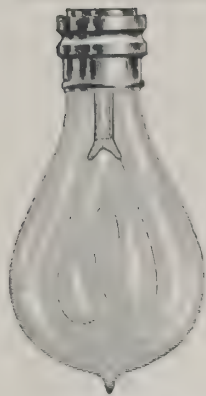
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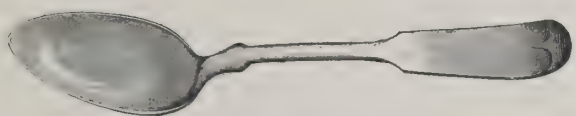
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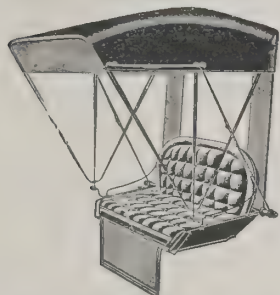


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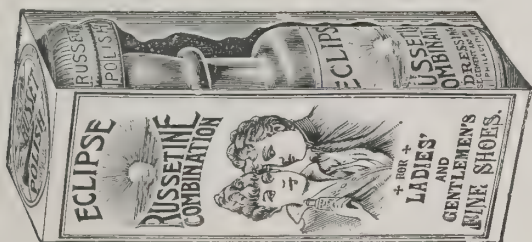
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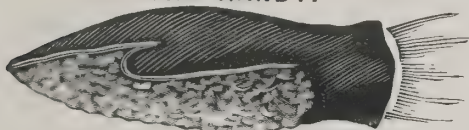
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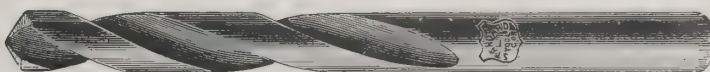
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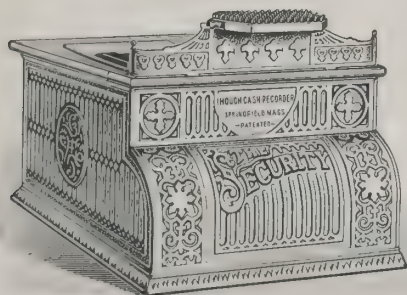
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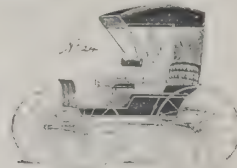
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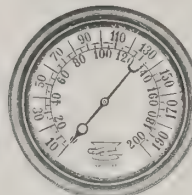
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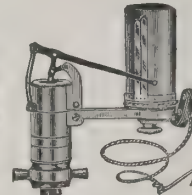
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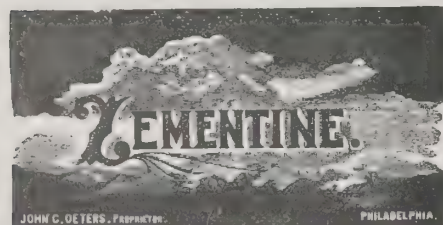
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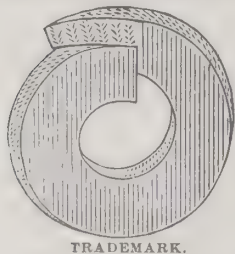
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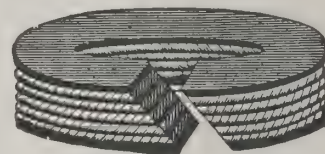
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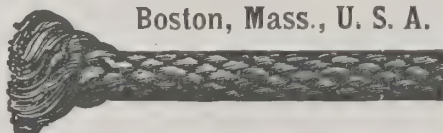
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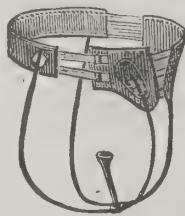
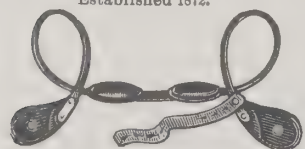
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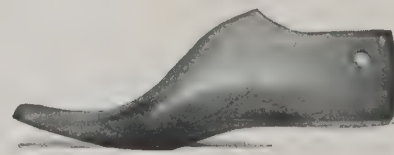
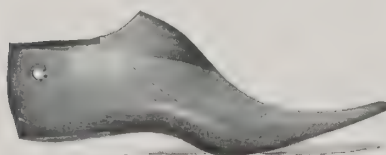
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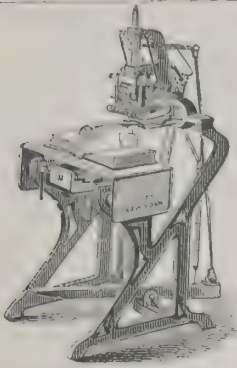
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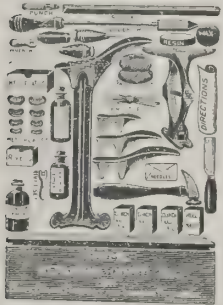
So writes Hon. D. J. Brewer,  
Justice U. S. Supreme Court.IT IS A THOROUGH REVISION OF THE UNABRIDGED,  
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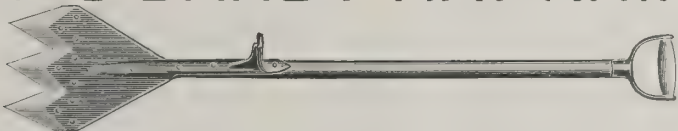
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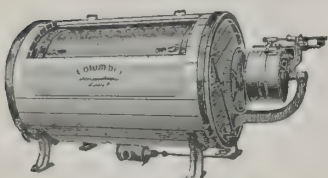
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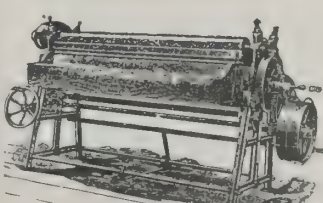
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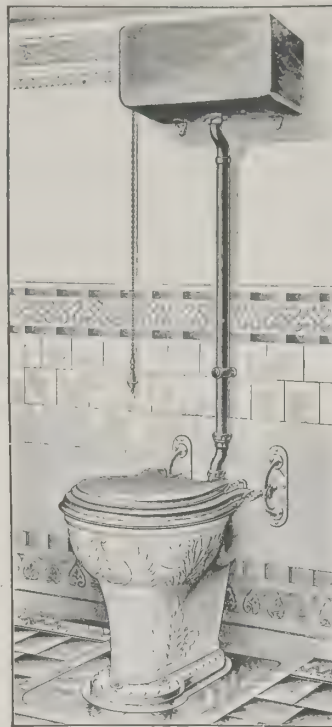


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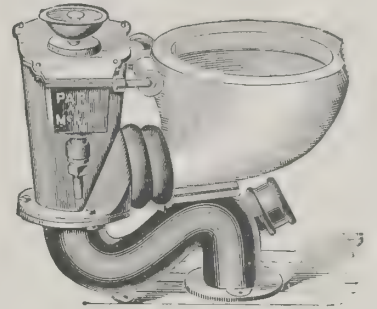
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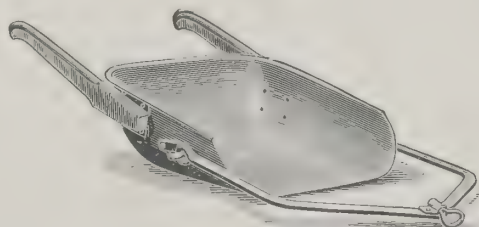
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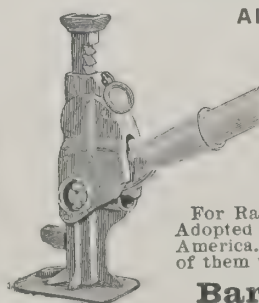
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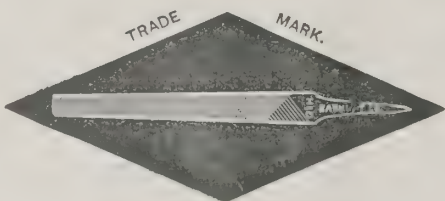
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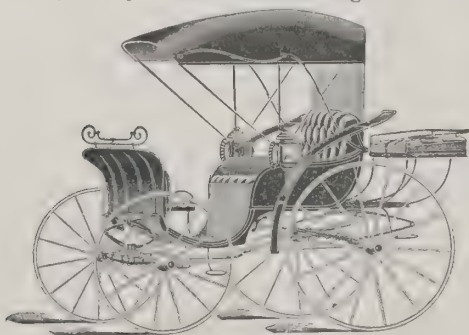


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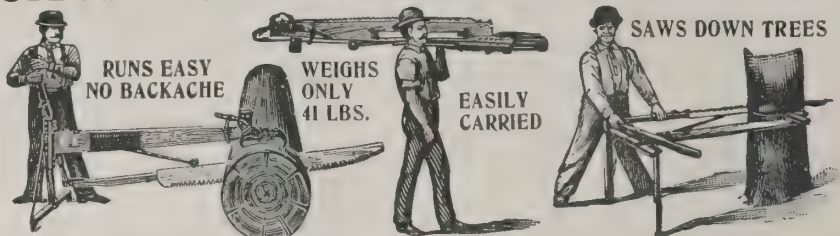
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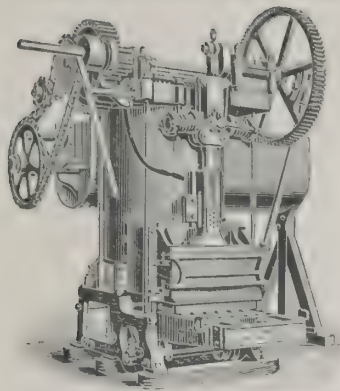
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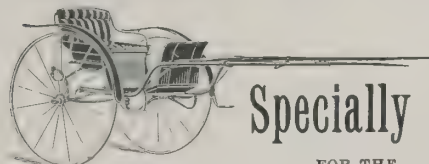
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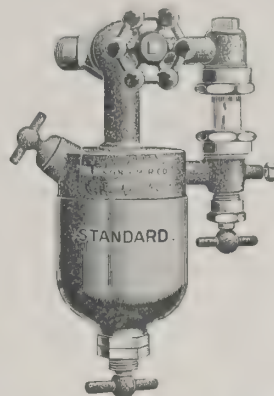
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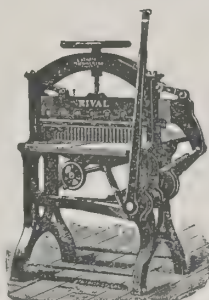
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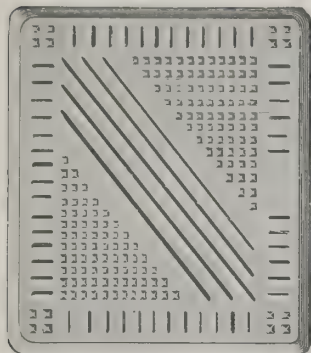






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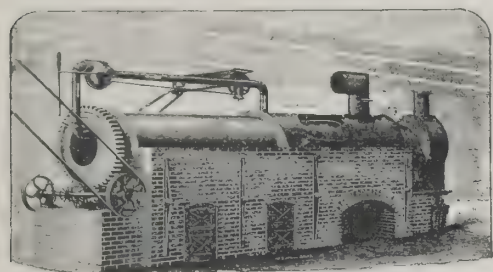
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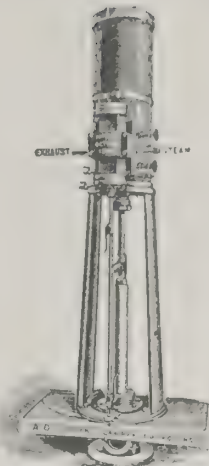
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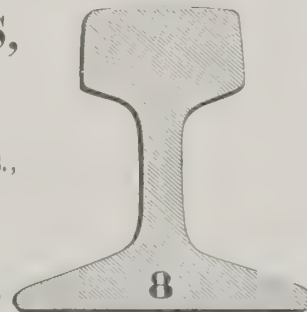
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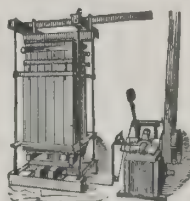


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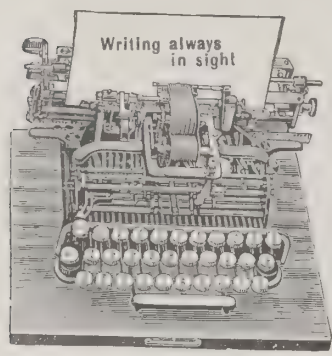
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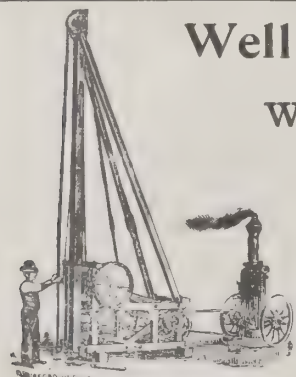
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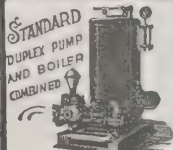


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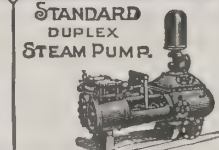
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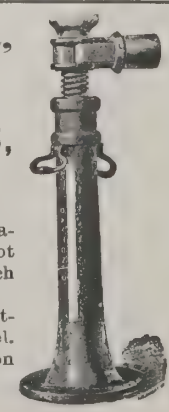
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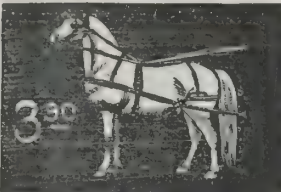
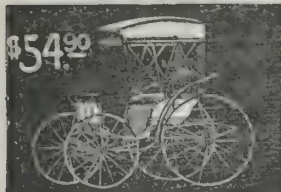




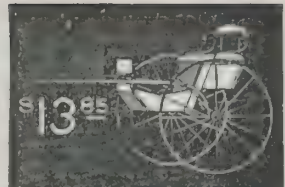


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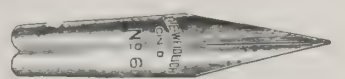
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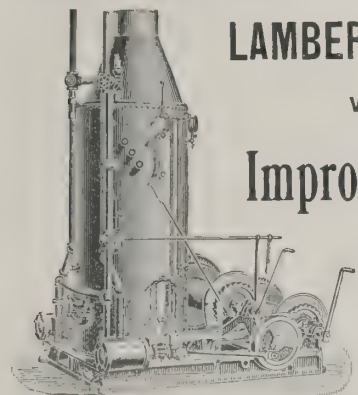
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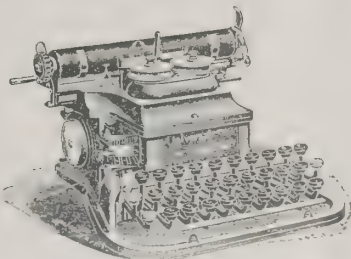
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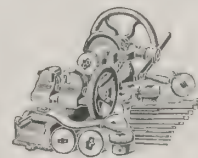
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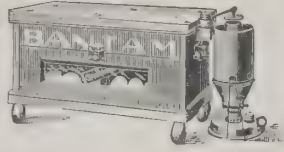
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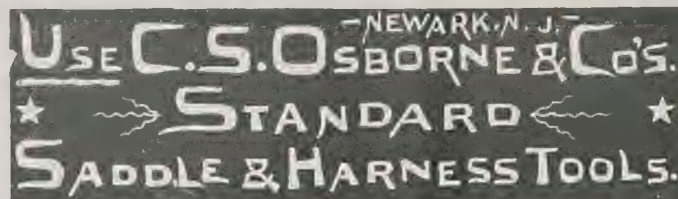
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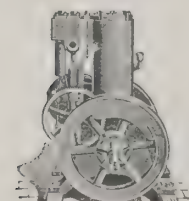
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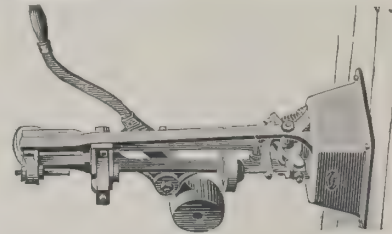
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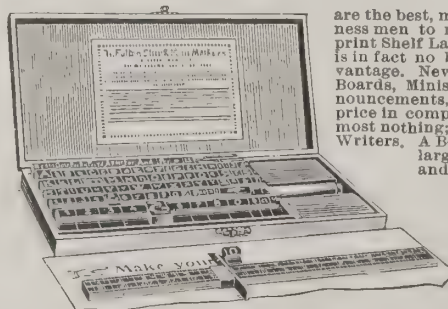
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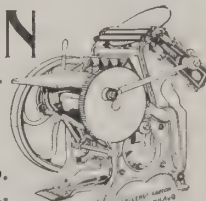
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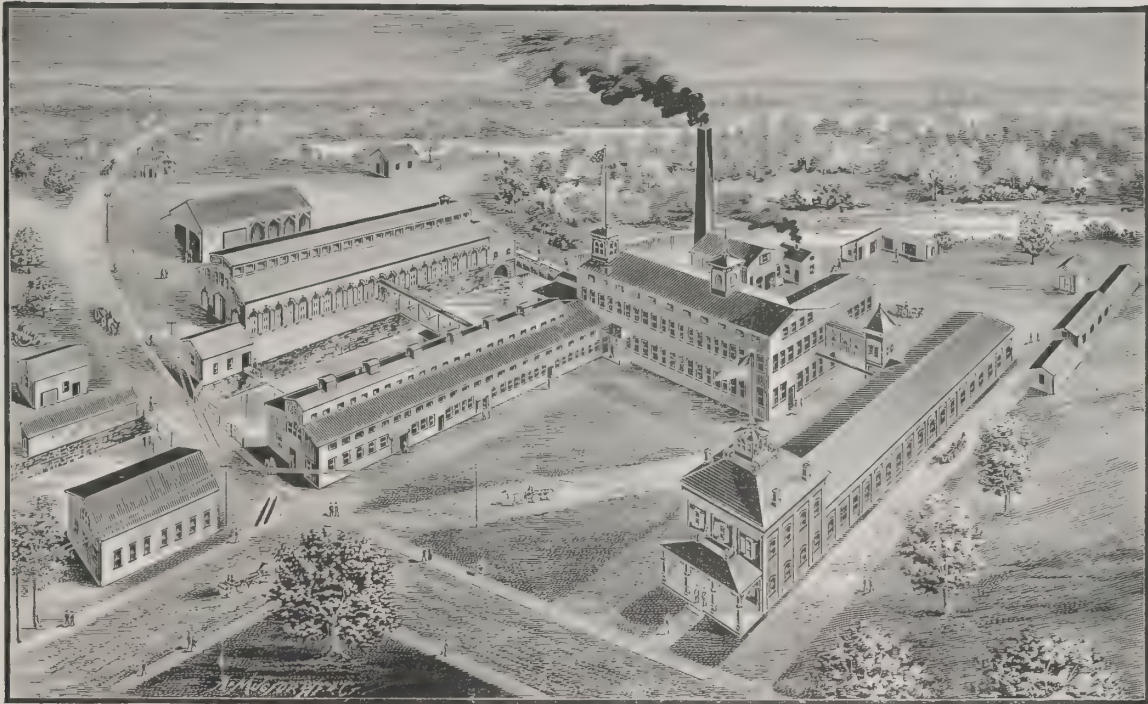
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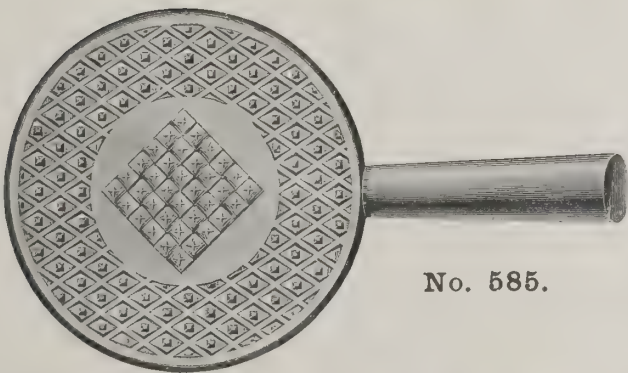


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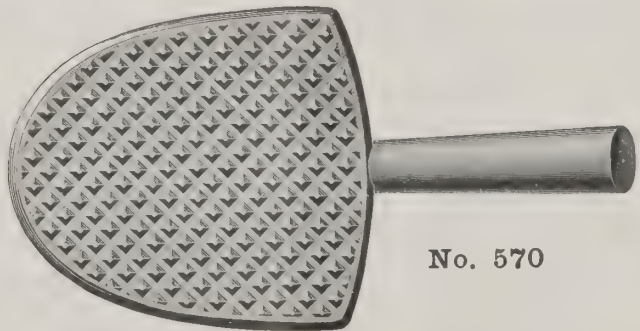


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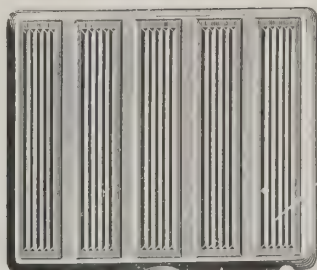
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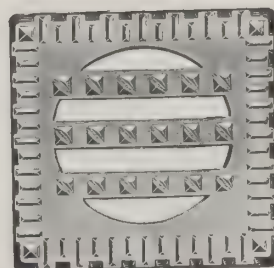
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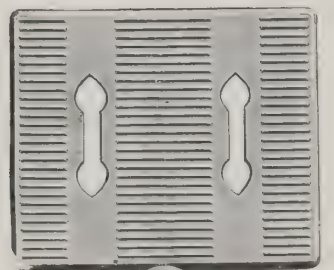
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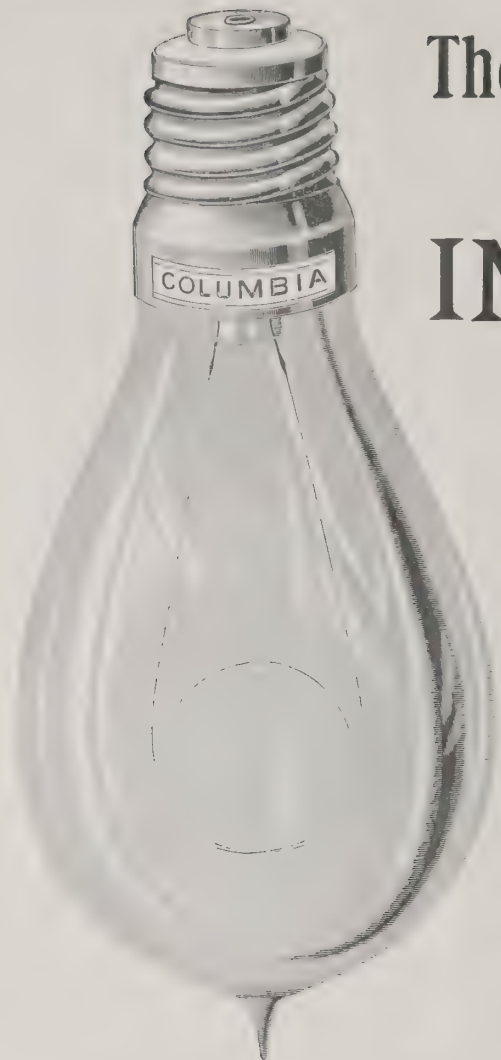


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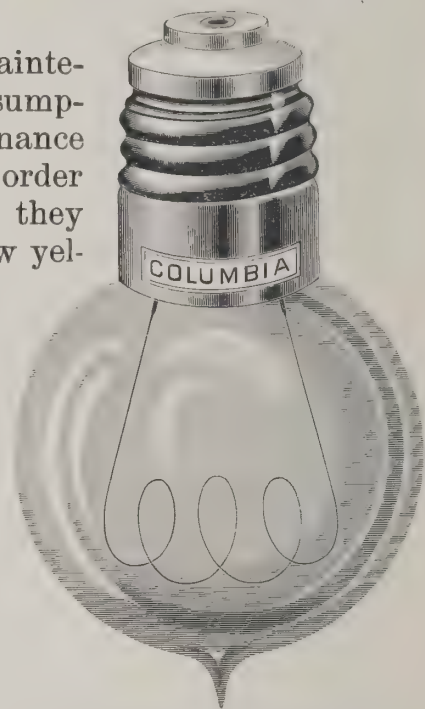
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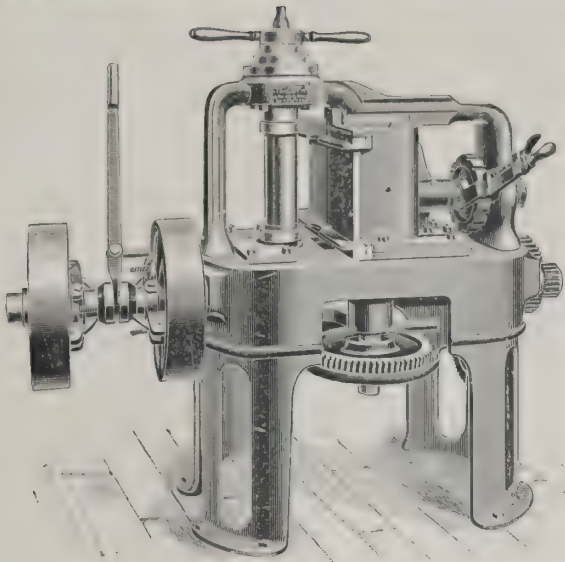
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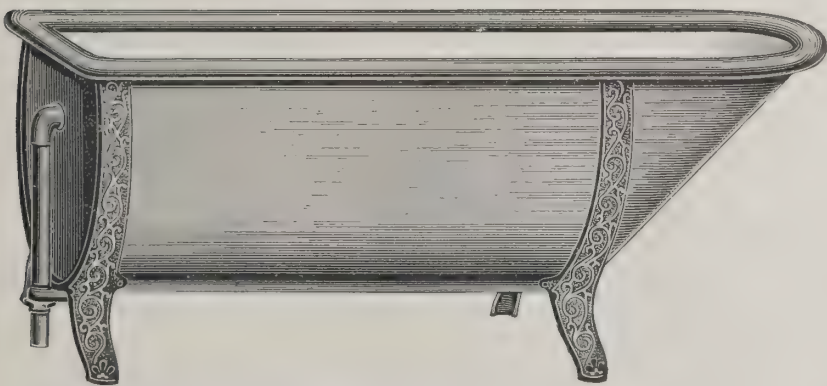
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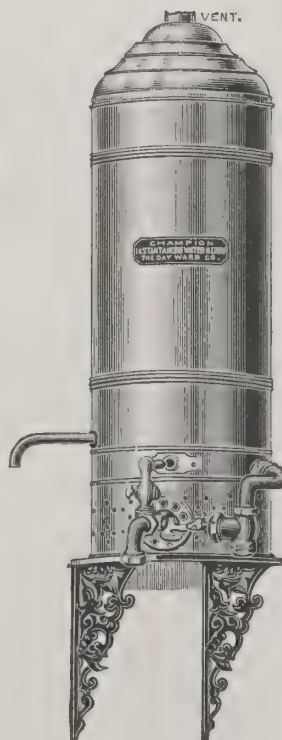
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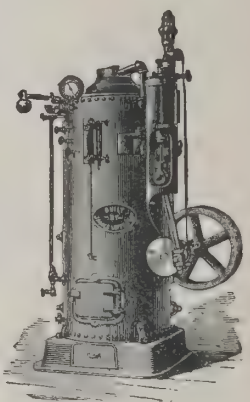
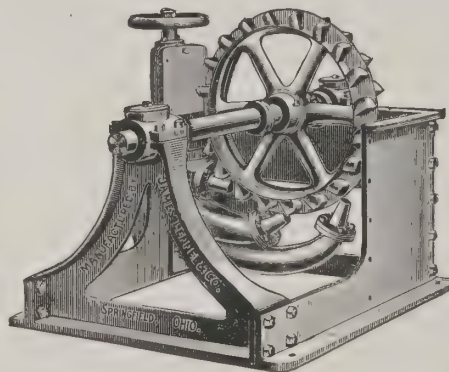
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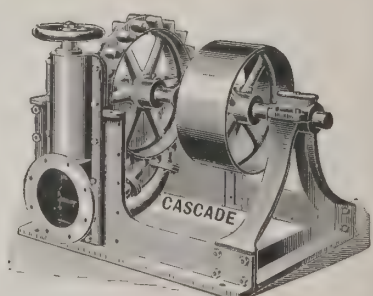
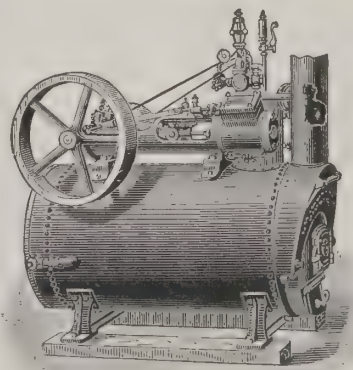
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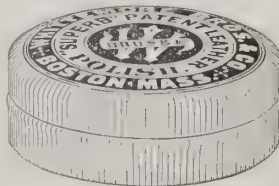
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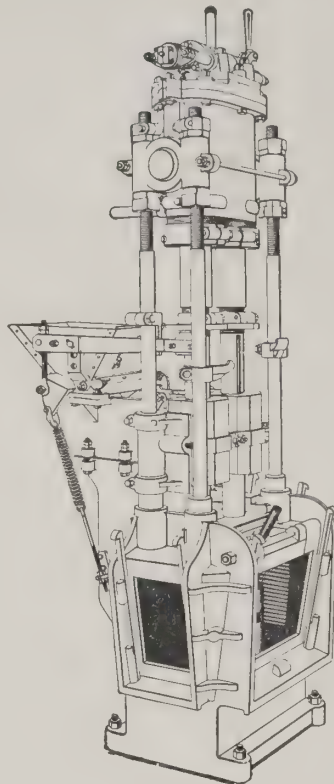
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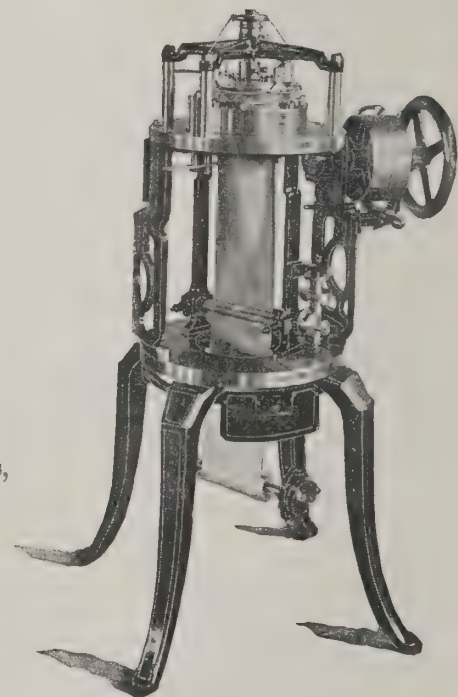
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## AMERICAN RAILS FOR INDIA.

AMONG our short notes upon American exports is one touching upon the shipment of steel rails to India. These orders, the first of their kind, are not only very gratifying to the companies directly interested, but are a marked tribute to the fast-growing commerce of the United States.

Since the time when we became an important factor among the food-producing nations of the earth, when we began to supply a great portion of the world with cereals, lumber, cotton and minerals, we were told that these things were merely the natural products of a rich country. That under existing conditions we could never hope to mold or fashion these raw materials with the skill of the old-country artisans, and that even then the cost of our labor was so high that the price of our manufactured articles would preclude them from the foreign markets of the world. That but for stringent Government measures we could not even supply our domestic trade.

This was so long and so constantly drummed into our ears that we practically accepted it as a fact and went about our business content with an ever-increasing home market.

Suddenly we had our eyes opened. Unwittingly we forced ourselves to do something, and that something showed to us our possibilities.

We were a little timid at first, but the first step had been taken, and there was no going back. We had built around us a veritable Chinese wall for our own commercial protection. We fostered every industry, sometimes to the extent of direct bounties.

Our great traders became manufacturers, and our manufacturers kept on extending their factories.

There came a time of wonderful prosperity. The revenues of the Government increased enormously, and the balance of trade was turned heavily in our favor. The national debt began to disappear at a rate to alarm financial institutions. The time was actually set when the American Republic would have redeemed all of its securities. Wealthy countries then poured their money into American industries. Manufacturing interests were still further boomed, and facilities for transport were increased and perfected in like proportion.

Enterprise became overdone, and a reaction set in. The enormous capacity of mills and factories recklessly run at high pressure had flooded the market. The manufacturers found themselves between the devil and the deep sea. They must either enter upon a war of extermination, one with the other, at ruinous rates, or shut down at fearful loss the immense plants they had built at great cost.

Warehouses were packed with stocks from cellar to attic, and the situation became desperate. Then it was that these surplus

goods found their way to foreign lands by sheer force of circumstances. They were sacrificed, it is true, but they were as good seed scattered upon fertile soil, and to-day we begin to reap the harvest.

We opened the eyes of the world to the fact that we had manufactured goods to sell of every variety, and that our workmanship could stand the test of comparison with theirs.

The trade thus washed up by the wave of depression has been growing and strengthening daily, for the American is not slow to seize an opportunity. The labor market was against him, but his ingenuity found means to circumvent this, and in no part of the world to-day can be found labor-saving tools and machinery to equal those products of his brain. Thus has he equalized things, and with the abundance of raw material at his door he is able to deliver his coals in Newcastle, or, what amounts to the same thing, to deliver steel rails not only to India, and on a contract of 7,708 tons outbid his English competitor by £8,675, but to carry them into the very centre of England's own steel industries at home. And he sells them at a profit, too.

The skill of the American mechanic can no longer be questioned. Why should it be? "The proof of the pudding is in the eating."

He has fairly earned his title to ingenuity; he is forced to be expert, and he has the best masters in every line from all quarters of the globe to instruct him—an opportunity afforded to no other people in the world.

## ELECTRIC RAILROADS IN THE UNITED STATES.

NO industrial development has ever been so rapid and complete as the transformation of horse into electric railroads in the United States. Within about ten years nearly the entire street railroad system of the country has undergone this change. If horse cars are in use now anywhere it is solely on account of "the law's delay" in permitting the change to be made. Horse cars are now as little known on the streets of American cities as stage coaches are on its post roads.

Remarkable as this change is in itself the collateral advantages that have sprung from it are no less remarkable. The accommodations afforded by electric roads are far superior to the best possible with horse-car systems. This is first noticeable in the length, weight, style and comfort of the cars. The heavy trucks and bodies of some of the electric cars could hardly be moved by animal power, but they are operated by electric power regardless of load, curves, grades or weather conditions, apparently without an effort. In addition to this, during the hours of heavy travel trail cars are added to the motor cars.

The transformation, too, has not been alone one of motive power. In nearly every instance where electric power was adopted extensions of the service have been made that have brought large areas within the zone of municipal residence. This, under the American system of fares, has been of the highest value to the wage-earning classes. In Europe the system of charging by distance tends to deprive the poor people in cities of the advantage of spreading out into suburban districts, keeping them huddled together in tenement-house quarters where the conditions of life offer the fewest benefits.

The rates of fare in American cities are remarkably low. In fourteen of the largest cities, taking the longest ride possible for 5 cents into consideration, the fare is at the rate of half a cent or less per mile, the lowest rate being in Brooklyn, N. Y., where a distance of eighteen miles may be travelled for 5 cents, only .28 of a cent per mile. In those cities where the fare for the greatest distance is over half a cent per mile the highest rate is in Lynn, Mass. There the longest ride is six miles for 5 cents, being at the rate of .83 cent per mile. In contrast with these conditions it may be mentioned that the longest ride in Glasgow, Scotland, is five and seventy-three hundredths miles for a 6-cent fare, which is at the rate of 1.047 cents per mile. In Berlin, Germany, transportation given for a 10-cent fare is seven miles, equal to a rate of 1.43 cents per mile. Where carriage is as high as this a residence



in the suburbs is out of the question for the majority of wage earners. Such rates compel them to live near to their places of employment, resulting in abnormally high rents in the central portion of the city.

Recently a number of delegations have visited the United States for the purpose of investigating its street railway systems, not only as to construction, motive power and equipment, but also as to the methods of charging and collecting fares. The problem of the distribution of population is becoming urgent in many of the large cities of Europe. This problem has been solved in America by the long distances travelled at low rates made possible by the American systems of electric railways. In New York there is a mile of street railway track for every 4,042 population. In Philadelphia the ratio is 1 to 2,266 and in Chicago 1 to 2,857. On the other hand, in Paris the ratio is 1 to 13,557, in Berlin 1 to 10,000 and in Glasgow 1 to 11,507.

American exports of street electrical railway apparatus, construction and operating equipments are rapidly growing. In all countries where light railroads are desirable, for either passenger or freight service, the American system will be found to respond readily to every requirement.

### EFFECT OF MACHINERY ON THE WORKINGMAN.

A GREAT deal of discussion on the value of labor-saving machinery to the workingman has occupied public attention for some time past in the United States. Many prominent thinkers and learned divines have entered into the debate and much has been said pro and con.

The publication of the views of the Rt. Rev. Bishop Potter, of New York, gave rise to a host of interesting opinions. The bishop is known throughout the length and breadth of the land as a student of men and an authority upon all social problems. He is as well a philanthropist and a friend of the laborer, and his high position and standing in society abundantly qualified him for the task of arbitrator between labor and capital, a position he has more than once filled with satisfaction to the employer, benefit to employee and honor to himself.

He claims that the progress in mechanical labor-saving devices has been more or less at intellectual cost to the laborer and mechanic. He claims that the use of machines makes an automaton of the man; that it narrows his range of thought and leaves little scope for either his skill or ingenuity. Man is essentially a thinking machine, and if deprived of the necessity of thought during the progress of the long hours of labor his mind must become rusty and stiff like any piece of unused machinery. He illustrates his views with a description of what he saw in a visit to a large manufacturing establishment. He saw a man operating a certain machine. This man's sole duty from 7 in the morning till 6 in the evening consisted in picking up piece by piece-iron rods from a pile upon his left, holding them in place for a second beneath the huge press that bent them into shape and then laying them upon a pile to his right. All day, all week, all month long the same monotonous occupation. The bishop says such work surely would drive him mad and it must have an injurious effect upon the mind of the man. No wonder, he adds, that once released from the precinct of the workshop the reaction sets in and he flies for relief to the saloon or the public house. The good bishop argues that if there were no press in that shop this man would be required to fashion these iron rods by hammer and anvil, that mind as well as muscle would be in active service and there would be no room for brooding or for the unhealthy thoughts that take possession of men's idle minds. Truly there seems much logic in this, but we do not agree with Bishop Potter.

There must under all conditions of work be various grades of workers, from the factory superintendent down to the drudge or common laboring hand. Now supposing an accident were to happen to that press and it become necessary to fashion those rods by hand. The man whom the bishop watched with so much interest would be relegated to another duty. He might possibly have the

carrying an pile of the material while the skilled mechanic above him would step up to the anvil and do the work. The machine merely supplied the place of the man's intellect and enabled him to perfect work that otherwise would never have fallen to his lot. Had this man the genius that makes a mechanic he would soon be found at the lathe, the bench, the anvil or the engine where there would be ample scope for the exercise of his mental faculties. Is it not a matter of fact that the development of the mechanical age has opened up vast avenues to fame and fortune for the workman? With all the wonderful labor-saving devices in the United States to-day there are more men actually employed in workshops and their condition is better than it was fifty years ago. The injurious effect of the machine upon the man is supposed to be pretty much upon a par with that of idleness, but the injury is really not so very great. A man with a highly trained and ever-active mind should not measure by his own mental standard the feelings of a man who lives by mere physical exertion. If Thomas Edison were taken from his laboratory and compelled to sit idly on a bench for hours at a time his torture would be more than he could bear. Yet note the stoical platitude of the tramp as he whiles the dull hours away on the seat of a public park. We have talked to many and we have listened as they talked to each other. We have come to the conclusion that they do not think. They haven't a care beyond that for the necessities of the moment. This, of course, is the lowest type of the civilized human kind. As a man's mind is trained and expands he must rise like the mercury in a thermometer to his proper level in the mechanical world. If he fails it is because he is a drone, and the world has no use for drones.

In a recent published letter the Rev. N. B. Hilles, touching upon the "Moral Uses of Machinery; the Modern Pentecost of Tools, Not Tongues," differs materially with Bishop Potter. He says in substance: "That slavery was once patriarchal, but now is considered industrial. The machine was once the accident of man, now man is the incident of the machine. Machinery is not an enemy of human happiness, but on the contrary it represents the uttermost of kindness and divine benefaction. It gives the one-talented man an opportunity to hold a respectable place in the race with his five and ten talented brethren. By making one of the sixty different parts of a shoe the one-talented man becomes a creator, through the gift of a tool which gives him a nine-hour workday and four times the wages of his father. The secret of happiness is doing with might the work one finds to do, and he who toils to add to the happiness of others is in partnership with God's plan. The thinker in wood and steel stands side by side with the thinker in literature, oratory and law. The world will be happy when Watt and Stevenson march side by side with Shakespeare and Milton, and when artisan and artist are equally honored. Machinery increases the intelligence and refinement of mankind and furnishes comforts and conveniences to those who are called weak and poor. It gives them leisure for study and travel, time to cultivate body and mind and to redeem themselves from obscurity and drudgery."

### GROWTH OF AMERICAN MANUFACTURED EXPORTS.

OUT of a total value of exports from the United States of \$1,051,987,091 during the fiscal year ended June 30 last, the Treasury exports credit no less than \$276,357,861 to exports of articles of American manufacture. The proportion of manufactured commodities to the total of exports is 28.78 per cent. Last year it was 26 1-2 per cent., in 1895, 23 1-8 per cent., and in 1890, 17 1-8 per cent. Both in volume and in their relation to the mass of traffic our manufactured exports have steadily increased during five years past. The phenomenal harvests of 1892, which led to partial neglect of foreign trade in American manufactures because of the abundant opportunities for traffic in the products of the earth, marked the lowest level of American manufacturing enterprise in the export trade—\$158,000,000, in round numbers, out of a total value of exports reaching \$1,015,000,000.

From this point, denoted by a proportion of scarcely more than



15 1-2 per cent. of manufactured exports, the annual increase of our international traffic in goods of American manufacture has been large, accelerating in volume, and apparently permanent. During the past four years the specialization of industries, readjustment of prices and wages, and development of new methods in industry, which have been necessitated by an acceptance of modern current standards of valuation, have combined to confer additional advantages upon the American manufacturers enjoying exceptional natural advantages or manifesting superior inventive talent. Thus, in the finer grades of machinery, instruments of precision, special steel shapes and steel railway bars, and electrical appliances of almost every description, the foreign measure of demand is fairly met by American products wherever there is full and free competition with the output of other industrial nations.—*Newark News*.

### A NOTABLE RECORD FOR AMERICAN EXPORTS.

AMERICAN exports for the year ended June 30, 1897, have made a new record. Never before has the aggregate for one year's business reached the present amount. The highest previous record was for the year ended June 30, 1892, when the United States had been called upon to supply an enormous quantity of grain to carry Europe through a season of short crops. In that year the value of manufactured exports was 15.6 per cent. of the whole, while for the year 1897 the manufactured exports was 26.78 per cent. of the whole.

The exports for 1897 are not only larger in value, they are larger in quantity and variety, and the excess of exports over imports is \$168,800,813. Such facts as these must go far to satisfy the commercial world that the United States has reached a point in industrial development where it can manufacture and export at profit an increasing variety of commodities notwithstanding the supposed differences in economic conditions between her and the older manufacturing countries of Europe. The contrast of total exports between the years 1897 and 1892 follows:

Total exports 1897.....	\$1,032,001,300
Total exports 1892.....	1,015,732,011
Excess.....	16,269,289
Total exports, manufactures, 1897.....	\$276,357,861
Total exports, manufactures, 1892.....	158,510,937
Excess of manufactures.....	117,846,924

This shows conclusively that the increased exports of 1897 came from the factories, not from the farms of the United States.

There is a disposition shown by some foreign writers to attribute this great gain in manufactured exports to trade depression in the United States, some going so far as to say that the trade has been done at a loss and for that reason cannot be continued. Those who believe this will be deceived. We assure foreign merchants that Americans are satisfied with the profits they have made on their export trade and that they are willing to fill foreign orders that will duplicate the trade of 1897 in 1898. The resources of the United States have a very wide limit. Everything in this country is drawn to a scale of great proportions. The ability of American manufacturers to produce is limited only by their ability to sell. If the world will double its demand for American manufactures the orders will be filled just as the increased demand for American grain is now being met. Comparatively only a few American manufacturers have ever sought a foreign trade. The success of those who have undertaken it will induce others to make the attempt. The prestige of American-made goods will be sustained and carried forward with added energy. The larger the number who engage in export trade the greater its volume will become and the more power they will acquire to overcome foreign competition and prejudice.

One consideration should not be lost sight of by foreign buyers. The growing reputation of American goods tends to make the demand for them permanent, and the success attained by reason of those already sold smoothes the way for the introduction of numberless American devices that have not yet crossed the border of

their native territory. In whatever country a buyer may be should he desire to handle a manufactured article not made in his own country he should not feel satisfied that he has found the best article for his purpose until he knows fully what he might obtain from the United States.

It is instructive to know in what particular lines of manufacture the export trade has shown greater gains. The following short table will indicate:

Manufactures of—	1896.	1897.
Brass .....	\$872,396	\$1,171,431
Copper, not ore.....	19,720,104	31,621,125
Cotton manufactures.....	12,958,357	17,281,620
Cycles and parts.....	1,898,012	7,005,323
Scientific instruments.....	2,522,217	3,054,453
Iron and steel .....	5,509,188	6,627,406
Other machinery.....	14,853,221	19,771,856
Railroad bars (steel).....	540,797	2,482,208
Wire.....	1,506,885	2,252,617
Total iron and steel, not ore.....	41,160,877	57,497,805
Paper and manufactures of .....	2,713,875	3,333,157

The notable feature of this exhibit is the important gains made in the export of metals, copper and iron. The yield of American mines can be increased indefinitely. A slight decrease in the first cost of manufacture or a small advance in price would quickly double and treble the output. America is destined to become supreme in the production of metals, as it has been and is in the production of agricultural products.

### AMERICAN BICYCLES, 1898.

IN reply to inquiries of THE AMERICAN EXPORTER a number of the largest bicycle manufacturers have written their views upon the past season's trade and the prospects for 1898.

Few of them complain of the export trade of '97. Nearly all appear to have had a goodly share and seem perfectly satisfied. A strong feeling of hope exists, however, that not only will the ensuing year prove far more profitable to them and to the importing houses abroad, but that the final results will be infinitely more satisfactory to the foreign riders of American wheels. The changed condition of affairs, too, cannot but prove of substantial benefit to the whole American industry.

Notably in England a series of complaints has arisen about our wheels which can hardly be said to be counterbalanced even by the honest panegyrics that come through the medium of the press from all quarters of the United Kingdom.

It is easy to account for these differences of opinion. Americans are an energetic people and, taking hold of a popular idea, they are apt to push it to the limit. Last year they overmet the demand at home. The foreign markets, too, were fairly well supplied by their home manufacturers, making competition abroad a keen undertaking. The English wheel is a good wheel, but it is expensive. The American wheel is a better wheel, but delivered in a foreign country, 4,000 miles away, it is also expensive. There was, however, in England and in Germany a demand for this beautifully finished, perfectly balanced, light, yet durable, machine. English dealers apparently sought to profit by the reputation of "American." If they could only furnish American wheels and undersell by a fraction the makers of their own country the trade was theirs. The substantial houses on this side stood firm, but the weaker ones yielded to temptation—many of them had to—and eagerly shipped abroad all their antiquated models and trashy goods. The result was inevitable: tares were sown among the wheat and the responsible American manufacturer had to suffer.

Last season's depression, however, will have a beneficial effect upon next season's trade. The little fellows are pretty well weeded out and the big fellows are far too wise to nibble at any bait likely to land themselves in particular and their trade in general in the net of adverse British opinion.

Nearly all our correspondents look forward with the greatest confidence to the debut of the "1898 American." They have something up their sleeve—a sort of pleasant surprise in store for our friends abroad.

There has been some comment about the chainless wheel, but it does not seem to prosper here. A few makers may possibly put



them on the market, but it is expected that the public will be very wary of investing until success has been fully demonstrated. According to general opinion, the firms in England and in France who have been experimenting with chainless wheels during the past two years have not met with pronounced success, notwithstanding the immense sums of money that have been spent in the endeavor to develop the principle.

#### OUR EXPORT TRADE STILL INCREASING.

THE report of the United States Bureau of Statistics upon the exports of domestic merchandise for the year ended June 30th shows a very healthy and most gratifying state of affairs. It records a net gain in the value of goods exported from this country for the twelve months ended June 30th over the preceding year of \$168,800,813.

For the month of June alone the increase amounted to \$6,952,733 distributed in part among different industries as follows:

	June, 1896.	June, 1897.	Increase.
Agricultural implements.....	\$492,152	\$656,885	\$164,733
Bricks .....	9,555	27,699	18,144
Books, maps, printed matter.	181,961	207,458	25,096
Boots and shoes .....	132,120	164,520	32,400
Brass and manufactures of...	95,218	106,488	11,270
Carriages and vehicles.....	161,421	167,323	5,902
Cars, passenger and freight..	71,446	318,385	246,939
Chemicals, drugs, dyes and medicines.....	734,113	793,849	59,736
Copper and manufactures of (not including ore).....	62,930	95,917	32,987
Cycles and parts of.....	515,798	882,984	367,186
Doors, sash and blinds.....	23,343	58,373	35,030
Firearms.....	49,364	62,489	13,125
Glass and glassware .....	82,890	105,073	22,183
Harness and saddles .....	16,547	19,211	2,664
Household furniture.....	295,186	332,231	37,045
Instruments (scientific) .....	203,429	258,643	55,214
Locks, hinges and builders' hardware .....	280,408	343,162	62,754
Locomotive engines .....	85,152	166,483	81,331
Musical instruments.....	86,274	98,463	12,189
Moldings, trimmings and other household furnishings .....	15,105	23,518	8,413
Machinery (not otherwise specified).....	1,422,385	1,841,034	418,647
Paper and manufactures of ..	247,484	365,468	117,984
Plated ware .....	37,144	42,000	4,856
Printing presses.....	11,754	56,257	44,503
Provisions .....	11,502,047	12,975,154	1,473,107
Roofing slate.....	38,035	78,479	40,444
Saws and tools.....	182,484	214,150	31,666
Sewing machines and parts of	284,303	387,795	103,492
Stationary engines .....	14,751	27,766	13,015
Stationery (except paper) ....	65,000	87,404	22,404
Varnish.....	34,011	48,485	14,474
Watches and parts of.....	44,823	68,082	23,259
Wooden ware.....	30,381	38,555	8,174

#### AMERICAN SLATES IN ENGLAND.

IN America the commercial world is probably more frequently disturbed by that baneful disease called "strikes" than any other country, and at times we have felt the handicap seriously. We are told that misery loves company and we might possibly be excused on this plea if we were to give expression in clear type to the feelings of our inmost soul when some neighborly competitor is made to feel the smart of internal labor dissensions and is *pro tempore* placed *hors de combat*, leaving to us a clear field. An expression of thought likely to arise under these conditions would be, well, let us say, unsportsmanlike, so we won't give vent to them. We are pleased to note, however, through the columns of an esteemed English contemporary that American slates for roofing purposes have quite recently been received with much favor by a well-known Scotch firm, and Welsh slate quarrymen are brought to task and cautioned to consider well the fact of this new importation by the same journal. This may be the thin edge of the wedge which by force of circumstances we have been able to place in position. We are frank enough to express the hope that we may be able to drive it home and to keep the trade once established.

The slates referred to, which were landed at Leith, are what are known here as the Arfor blue slates from Virginia. They have been used in England before, chiefly in the Liverpool district—the most direct point of connection with the American market—but

this particular shipment is the first we have had the honor of consigning to Scotland.

We count on future years bringing us a reputation for these same slates, as they have stood the test of about forty years upon such national buildings as the Smithsonian Institute, the Army and Navy buildings and the Treasury at Washington. The Assay Office at San Francisco is also slated with them.

#### Views of Foreign Visitors.

A GREAT deal of interest has centred in the recent sessions of the Commercial Museums Advisory Board in Philadelphia. A number of delegates representing nearly all the States and Republics of Southern America have been in attendance, and a few quotations respecting things seen in the United States by some of these gentlemen will be of interest.

Mr. Ignacio Nery de Fonseca, of Pernambuco, Brazil, referring to the hardware, glass and china trades, said that he admired the magnitude of some of the factories visited. He was convinced that in the department of cutlery the United States compared favorably with European makers in spite of competition. In the matter of glassware, as far as he could observe, the principal factories of the United States had obtained the greatest perfection in molded goods.

Captain Cordelra da Graca, of Brazil, after discussing scientifically the metallurgy of iron and steel, showing the great progress of this science in the nineteenth century, spoke about the rapid progress of the industry in America. He entered largely into the consideration of coal mines here and there, and proved that by the perfection of the machinery used in the various iron works the United States could surpass Europe.

Speaking next of electricity, as applied to the conversion of ores, he remarked that the appliance would soon become practical and valuable, and that the world would be indebted to the United States for the improvement.

In eulogizing the shoe and leather trade of the United States Mr. Paul Zilling, of Stuttgart, said: "There can be no doubt that the leather industry is one of the most important in the United States, and one of those which will be able to take a great share of the export trade of this country. \* \* \* In Milwaukee we visited some tanneries which are said to be the largest in the United States, and have learned that they send part of their products to Europe and that they will be able to supply about one-half of the markets of South America. \* \* \* American leather trunks and hand bags are very good and solid. They want no advertising; they are found in railway stations all over the world, and you can easily see that they will stand wear and tear." He also took up the shoe trade and referred to it as one of ever-increasing importance. The values, he said, were excellent, and a little discretion on the part of the manufacturers to adopt for export the shapes and styles in vogue in the South would insure for the Americans at least one-half of this particular trade.

Director Wilson followed this speaker, and, while regretting that the various delegates were unable to visit some of the most important tanneries of the country, he called their attention to the fact that we have in Philadelphia one concern which turns out for export alone 30,000 finished goat skins daily. This probably exceeds the product of one-half of the other firms in existence. These skins are also used largely in this country, but, owing to a newly discovered process of tanning, they have a peculiar finish and are especially called for in foreign markets.

In the course of a lengthy paper in Portuguese Dr. Fernando Mendes de Almeida, of Rio de Janeiro, referred to printing machinery and vehicles. While admiring the marvellous productions of intricate and labor-saving machines and presses he feared the ability of the Brazilians to purchase would be limited by the cost. That the trade in his country had not yet reached that stage in the matter of printing which demanded such expensive and intricate machines.

Continuing, he said; "In the manufacture of paper Americans not only compete successfully with Europeans, but the quality is superior and the finish is exceedingly fine. The price is also cheaper, and it only remains for the manufacturer to introduce his paper, and to give long credits and make discounts the same as Europeans do."

He spoke very flatteringly of our motor engines and seemed to think that there was a very promising future for American electrical appliances in the country he represented. Next he touched upon traction wagons and light vehicles, which he declared were well built and displayed considerable ingenuity. He compared them to other foreign makes and gave the American a decided preference in material, workmanship and value.

AT the July meeting of the Board of Directors of the Philadelphia Museums, Philadelphia, the Executive Committee reported the departure of Mr. William Harper, chief of the Bureau of Information of that association, for South Africa, Australia and China, on a six months' tour, for the purpose of studying the requirements of those countries in the line of manufactures such as Americans can supply to their advantage, and to report to his association the best means and ways for increasing our exports to those countries. Mr. Harper is naturally highly qualified for such a mission, and going as he does under the auspices of the museums and fully equipped with credentials from the State Department and the Chinese Minister at Washington, we have no doubt of his success. Mr. Harper has for many years past been identified with the American export trade and has already visited several other countries on missions of a similar nature.



### Lighting Niagara by Acetylene.

IN an article written for the *Electrical Engineer* Mr. Orrin E. Dunlap says: The Acetylene Light, Heat and Power Company, of Niagara Falls, are making the first public demonstration of the illuminating powers of their gas in an attempt to light the great cataract. The lights were first turned on on the evening of Thursday, July 16. For the present the illumination is confined to the American Fall and the rapids of the upper river above and below the bridge leading from the mainland to Bath Island, generally referred to as the Goat Island bridge. In all, fifteen large locomotive headlights are in use, and eleven of them have seven burners each, while the remaining four have five burners. These burners are of the Naphey pattern, and consume one half foot an hour.

Six headlights have been placed on the Goat Island bridge, three on the upper and three on the lower side, while others have been placed in Prospect Park, and four below the high bank on the debris slope. The lamps on the upper side of the Goat Island bridge throw their beams on the water as it comes tumbling down from reef to reef, and the lights on the lower side gleam across the dancing waters as they speed onward toward the brink of the American Fall, their plunge over the magnificent precipice being illuminated by the lights in Prospect Park. As the waters tumble on the rocks below and send up a spray cloud the beams of the lights below pierce the mist and make a beautiful sight.

The expanse of the river just above and at the brink of the American Fall is very great, and this extent of space makes the lights appear as having no great penetrating powers, whereas the fact is that they are quite strong, but the apparatus in which they are fitted is hardly the thing to show them off in all their brilliancy. Then, again, the plant was installed with considerable haste, in order that it might be in operation on the occasion of the recent visit of the Pan-Americans. One thing fully made clear by the demonstration is that Manager Devine, of the Acetylene Light, Heat and Power Company, is a hustler of no small degree, for he had the entire equipment installed in a very few days.

The gas is supplied to the light from three Naphey automatic generators, each of 250 pounds capacity. One of these generators is placed in the inclined railway building adjoining Superintendent Welch's office; another in what is known as the lower park office and the third in a small building on Bath Island. From the generators  $\frac{1}{2}$ -inch pipe runs to the lights, and a large amount of this pipe was necessarily laid, the Oliver Company having the contract. All the pipe is carefully concealed beneath the sod or under the bridge.

This is not the first time the Falls have been illuminated. In 1879, when electric lights were somewhat of a novelty, the park was owned by a private company who had the enterprise to purchase a Brush generator to supply eighteen lights, but, after a few nights' trial, it was found that its capacity was not large enough, and the company exchanged their generator for one of larger capacity. With this outfit the Falls, park and gorge were nicely lighted, and in one Summer over 150 excursions came to the Falls at night to see the illumination. Every night the park was crowded, and not the least beautiful effect was the light thrown on the fountains through colored lights. When the State of New York took the park and opened it free to all mankind forever the electric-light plant was sold, and since then the great cataract has been shrouded in the darkness of night, much to the regret of the residents and visitors, for Niagara at its best is lacking in evening attractions, and the lights on the Falls served to aid in passing the evening. For this reason the acetylene illumination will be popular with all.

### The Dipping Process of Painting in America.

A PROCESS or, more properly speaking, a system of applying paints, varnishes and enamels to certain manufactured articles, such as agricultural implements, farm wagons, furniture and metallic beds without the aid of a brush has been devised and successfully carried out by American manufacturers.

It is practically the old method of dipping made new again and perfected. But the results now attained by the system in vogue here are so well nigh perfect that, save where the highest grade of carriage finish is required, the workmanship easily surpasses anything hitherto accomplished by hand. The rapidity too, with which it is done is astonishing. To compare it to old-time methods would be like a comparison between the latest improved locomotive and the stage coach of our grandfathers.

There has been a great deal of prejudice against the system, especially by old foreign manufacturing houses which had experimented for years along the same lines with disastrous results. They concluded that "dipping" was impracticable. But they were wrong.

The chief objection to the system has been that paints made sufficiently light to float lack durability and neither stain nor cover properly, and that when strong lead pigments are used they settle gradually and harden at the bottom of the tank.

This difficulty has been obviated by the adoption of a simple mechanical device in the bottom of the tanks whereby the color, regardless of weight and quantity, is kept constantly and thoroughly stirred and remains in a state of ebullition and suspension throughout the process.

The tanks of course vary in size and shape to fit the object to be painted. One of the simplest articles painted by this method is the iron bedstead which in America is almost universally white. Until about eighteen months ago Americans were large importers of this class of goods. To day they not only keep their own market supplied, but they have become exporters to a great degree.

A very serious item of expense in the manufacture of iron beds was the painting, and it troubles the manufacturers not a little to procure the maximum of good workmanship at the minimum cost. Boys and young women were employed, and were paid at the rate of from 15 cents to 18 cents per bed of six pieces, but as in most cases where contract labor is applied to work requiring skill and care, it was imperfectly done.

A year ago some of the principal factories employed from fifteen to eighteen hands in their paint shops. To-day with but three or four the same factories are turning out almost double the quantity. The waste of material is lessened, and the workmanship is by all odds superior. Not a run, not an edge, not a brush mark.

The apparatus for painting iron beds consists of primarily an iron tank six feet long, five feet deep and eighteen inches wide at the top, tapering to ten inches at the bottom. It is sunk in the flooring of the paint shop to within a few inches of the surface. Longitudinally through the bottom of this tank runs a steel shaft of one and a half inches in diameter. One end revolves in a brass bearing at one end of the tank. The other passing out through a stuffing box at the opposite end is made the axis of a fast and loose pulley. These are regulated to a speed of from three to four hundred revolutions per minute. Along this shaft, at intervals of a few inches, are fastened a series of two flanged propeller screws so constructed that when in motion they cause a strong current to flow from each end of the tank toward the centre. Here both currents meeting are thrown by the force of the contact to the surface, and the whole mass in a full tank which often holds in the neighborhood of five thousand pounds of liquid and pigments is held in a state of ebullition, thoroughly blended. Slanting off along the entire length of one side of the tank at a slight incline so as to drain into it, is the drip-board. This is about four feet wide and is usually sheeted with galvanized iron.

Overhead, running directly over the centre of the tank and drip-board, is a more or less elaborate system of tracks and trolleys suspended from the rafters. To the trolleys are attached iron hooks, and on these the sections of the bed are hung at an angle to permit of the paint draining towards a common centre.

Two men take their places at opposite ends of the tank. They are each armed with a couple of hand hooks. They simultaneously seize a section or end, immerse it rapidly in the tank, hang it upon the hook overhead, and pass it over the drip-board where it remains until all the surplus paint has run off. Next it is carried on by the trolley into dryrooms, or ovens, and allowed to hang there in a temperature of one hundred and twenty degrees for five or six hours, or until sufficiently dry to be handled with impunity. Next it is sent back by rail for its second coat, and finally finished in a tank of enamel paint.

Since the introduction of this system the output of the largest factory in the United States, averaging from three to four hundred beds daily, is readily handled by one experienced painter with two helpers.

Upon woodwork even better results are shown. Wagon wheels, agricultural implements and complicated gears are primed, second-coated and varnished without as much as a stroke of a brush.

After receiving their second coat they hang upon the carrying apparatus, and the strippers pass along the line and decorate them. They are next transferred without handling to the varnishing tank to receive their final or finish coat.

The varnish tank requires no agitator, but the varnish is especially prepared and thinned with certain reducers which cause it to flow freely without loss to its durability or lustre.

### An American Company for Venezuela.

THE Caracas Electric Light, Heat and Power Company, an American concern, just incorporated at Trenton, New Jersey, with a paid-up capital of \$1,000,000, has obtained a valuable franchise from the government of Venezuela which gives the company the right to construct and operate electric plants for lighting, heating and generating power as well as the right of way for an electric railroad.

The incorporators are well-known capitalists of New York and New Jersey, and their very names are sufficient to insure confidence and success.

For some years past Mr. James F. Carello, who has been most active in the organization of the new company, has had the contract for the lighting of the city of Maracaibo.

The contract in Caracas requires the installation of 400 arc lights for street lighting and 500 incandescent lamps for the municipal buildings, in addition to which the national government has subscribed for 1,000 incandescent lights for various public edifices and 100 arc lights to be placed in the Paseo de la Independencia.

The company has also acquired the right to generate and distribute heat by means of gas or electricity for domestic purposes. The power to operate their works will come from the falls of the Mocuto River which are estimated as capable of producing 6,500 horse power.

By the construction of dams and reservoirs the water will be concentrated at a height of 2,600 feet above the motors making, without doubt, the highest fall of water for its purpose in the world.

—An order to the value of \$8,200 has just been placed with a New York export firm for shipment to Italy of a number of pipe threading and cutting-off machines, as well as for a quantity of emery-wheel machinery. This is gratifying from the fact that it is the first order of the kind received. Heretofore Italy has always looked to Germany and France for such supplies.

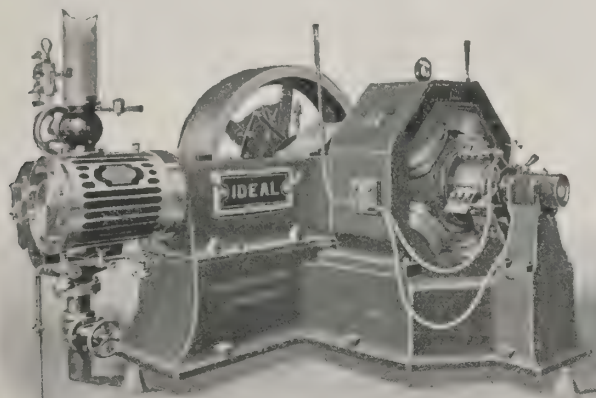


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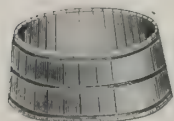
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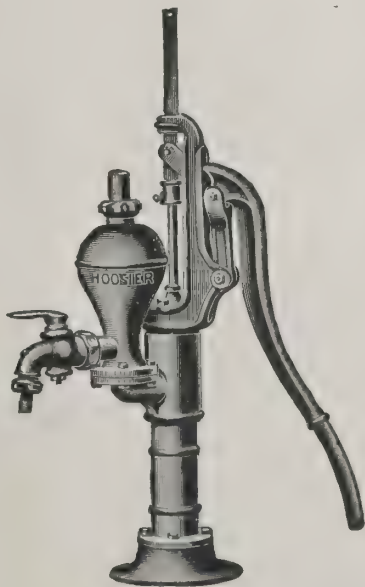
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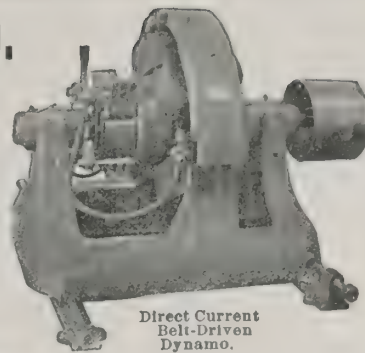
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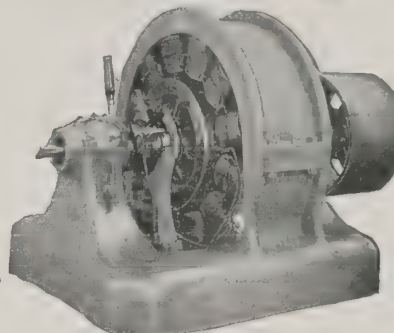


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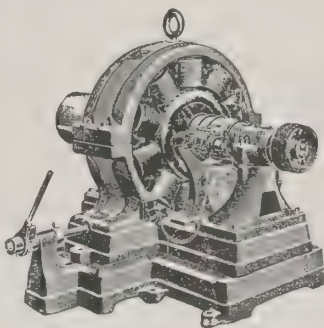


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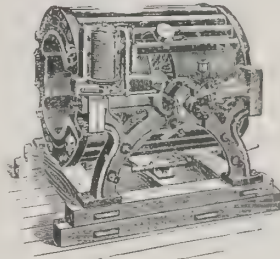


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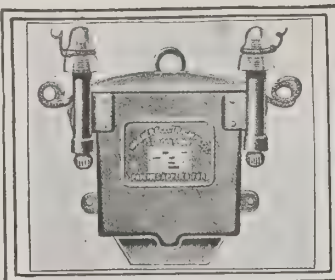
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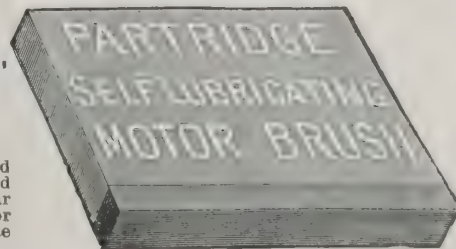
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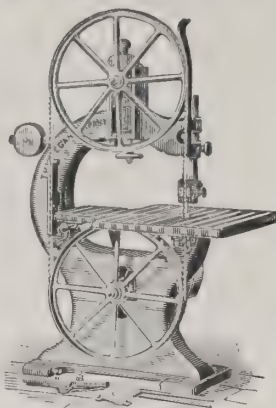
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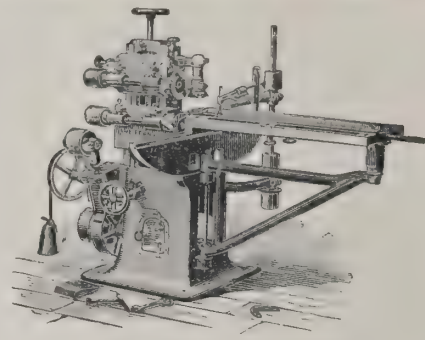
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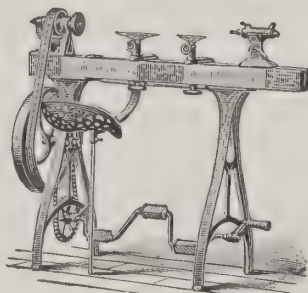
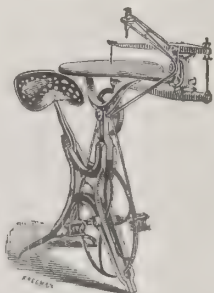
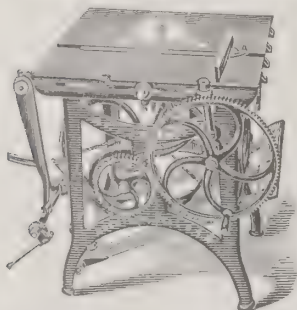
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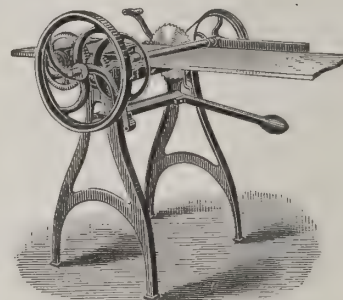
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## Power Machinery

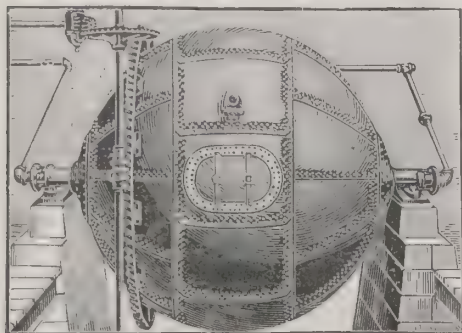
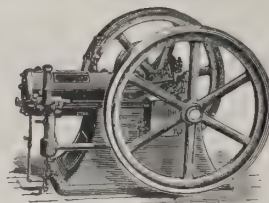
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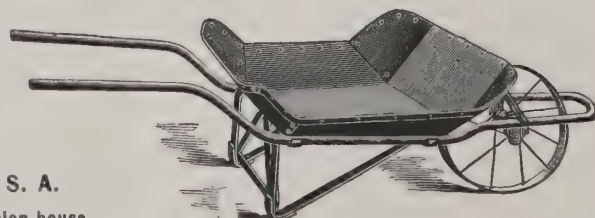
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RADIAL TUBE AND ROTARY GLOBE BLEACHER BOILERS.

The Rotary Globe Bleacher Boilers are used by paper mills whether rags, rope or straw is used, and no paper mill is complete without one.

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DEVOTED TO THE FOREIGN TRADE IN MACHINERY AND HARDWARE.

### Sewing Machines.

IF there is any manufacturing industry in which America excels it is in the making of sewing machines. She is the centre of the sewing machine world, and in New York are directed and controlled nearly all the great factories producing these machines. Fully 90 per cent. of the trade of the world in this line is managed and handled there.

The annual output of American factories now reaches upwards of 600,000 machines, and in one way or another nearly 100,000 people make their living out of the industry, either as factory operatives, agents, clerks, canvassers, collectors or in some capacity connected with the manufacture and marketing of the goods. The American reaper and mower and the American watch are the standards for the civilized world. So, too, is the American sewing machine, and the export trade in this line extends to every quarter of the globe.

Everywhere the American machine holds the market against all comers, not upon a mere question of price by any means, but by merit, quality and reputation.

Our only serious competition comes from Germany, where they have gone very earnestly into the business and are turning out machines which show a marked improvement upon their produce of some years ago. Owing to certain banking facilities they handicap us by being able to give long and extensive credits on export sales. It is not unusual for a German house to wait six and nine months for returns, while our agents and buyers are required to pay cash. Notwithstanding this apparent disadvantage we still lead a long way in the race and it is hardly probable that we shall ever lose our position.

The money value of sewing machine exports from this country for the year 1895 was \$2,260,189, and for the thirty years ending with 1895 \$67,245,243. During 1896 the export trade reached \$3,051,168, a gain of \$791,039 over the preceding year. There was an increase in sales to the United Kingdom, British Australasia, Africa, Germany, France and some of the South American countries, and a slight falling off of machines sold to Canada. The figures relating to France include only the machine proper, as under the high retaliatory duty enforced in France against American goods it is not found profitable to export the iron stands and wooden cabinets.

Cuba, which in 1895 took \$16,114 worth of sewing machines, in 1896 fell away to \$3,661, and this was mostly for attachments, needles, etc. The average value of the exports of American machines indicates that 150,000 machines are sent abroad annually, and the total number sold foreign countries, including those made abroad, equals the sales in the United States by all the American companies.

There have been great fortunes made and great opportunities lost in this industry. Elias Howe realized over \$1,000,000 in royalties and license fees for his inventions and improvements, and Isaac M. Singer lived to see the business of which he was the founder develop into colossal proportions from an investment of \$40.

The last important patent on a fundamental principle of the sewing machine expired twenty years ago, but the inventive genius of the age has not been idle all this time. Patents covering devices and attachments of greater or less utility have been granted in steadily increasing numbers. From February 21, 1842, to September 10, 1895, patents were issued on sewing machines and their parts to the number of 7,439. As many of these patents cover several minor features the aggregated patented invention is much greater. One of the latest devices for driving a sewing machine came in the shape of a revolving treadle with the bicycle movement, but none of the new ideas have yet proved so satisfactory as the old-fashioned rocking treadle. In no branch of manufactures has a greater revolution been wrought by the sewing machine than in boots and shoes. By its use not only have the quality, style and value of footwear been greatly enhanced, but prices have steadily declined until there is no nation of the world to-day whose people are so well and yet so cheaply shod as are the people of the United States.

Changes in shoemaking methods and processes have been most marked. Formerly the fitting of the uppers was accomplished by sending them out in small lots to be sewn by hand at the homes of the operatives. When the machine came into service the work hitherto scattered among different homes was concentrated at the factories and steam was used as a motive power. The first machine for sewing on soles was put into successful operation in 1861 and for the privilege manufacturers had to pay to the patentee a royalty of 2 cents per pair of soles. They must have derived a handsome income from this source, as

in one day of ten hours 900 pairs of shoes could be sewed on one machine, and by the use of machines 350,000,000 pairs of shoes had been made up to the year 1877 in the United States alone.

The machine now in general use does its work in a manner closely resembling hand sewing. This machine is considered one of the marvels of an age of mechanism. Thomas A. Edison is reported to have said after examining the operation of the sewing and wetting machine that it ranked equal with the Blanchard lathe in ingenuity and importance. At last it is certain that a shoe selling at retail to-day for \$3 is in all respects equal, and in many respects superior, to the \$5 shoe of fifteen years ago. The effect, too, of machinery has been to increase the beauty and finish of ready-made shoes.

During the early years of the sewing machine the custom tailors showed great prejudice against its use, but this has long ago disappeared and the machine is now in general use in making the finest of garments. The enormous increase during the past ten years in the factory production of clothing has been coincident with and largely the result of the invention of special appliances and attachments adapting the sewing machine to factory operations in the performance of stitching processes, including buttonhole and eyelet making, attaching buttons, staying seams, etc. From 1880 to 1890 there was an increase from 6,166 to 18,658 in the number of establishments in the United States devoted to the manufacture of men's clothing, and during the same decade the number of establishments devoted to women's clothing increased from 562 to 20,811. The last-mentioned figure include custom dressmaking establishments having a product of over \$500 in value, whereas the lesser figures for 1880 do not include establishments of this class.

In the census reports relating to the principal manufacturing industries that use the sewing machine largely the figures show that the total value of their products in 1890 had increased about 75 per cent. as compared with the value of their products in 1880. These industries employed 661,000 hands in 1890; they had about \$437,000,000 invested in machinery, tools and implements, and the total value of their product was \$1,161,196,659.

The reports of the sales of American sewing machines during 1873-76, the period of the sewing machine combination which was entered into by the leading manufacturers twenty-four years ago, show a total of 2,203,941, the average per year being about 576,000.

At present it is estimated that there are employed in the sewing machine factories of the United States about 10,000 hands, and that the number of machines produced is a little in excess of 600,000. It is impossible to judge of the incalculably fine workings of the most improved machines until one has seen the magnificent specimens of embroidery turned out by expert operators. Tapestries and copies of paintings are woven in fine silks upon canvas until the eye is actually deceived into the belief that the work is the result of clever manipulation of color and brush.

### Plow for Unloading Coal Cars.

APPLICATION has been made for a patent on a scraping plow for unloading sand, coal or ore from flat cars to a pocket bin situated below or on each side of the railroad track, as the train moves over the rails. The plow is stationary, instead of moving over a parallel track and scraping off the loads, as is now being done in the track-elevation work. The chief idea is to save time and at the same time do all of the unloading into one bin. This plow is arranged on a platform securely fastened to rails paralleling the track bearing the cars. The train is moved slowly along under the plow, which scrapes it perfectly clean from one end to the other. Much time is thus saved. The device is especially designed for unloading ore at docks, but can be used for gravel, coal, sand or anything of this character.

### The Tin-Plate Industry.

WHEN he was at the White House, Washington, President Cleveland was informed by Lascelles Carr that he (Mr. Carr) was wanting to see some of the new tin-plate works which had grown up under the McKinley tariff. President Cleveland answered facetiously: "When you have found them I hope you will let us know." There is no difficulty about finding such works to-day. They have taken the tin-plate industry clean out of this country; they have drawn it across the Atlantic, and with machinery thoroughly up to date are doing a great and profitable business.—*The Sheffield Daily Telegraph.*



### New Gear-Cutting Machine.

A MANUFACTURING firm of Rhode Island has recently placed upon the market an entirely new line of automatic gear-cutting machines and has embodied in their construction many improvements suggested by long experience in manufacturing and operating them.

The cutter spindle is rigidly supported on both sides of the cutter, and is powerfully and smoothly driven by spiral gears, thus avoiding the vibration and chattering common in machines driven by spur gears, as well as doing away with a belt-tightener or other device for adjusting the belt. The part of the spindle which carries the cutters is exceptionally large, allowing heavy cutters of large diameters to be used. The changes of cutter speed are easily and quickly obtained by the simple shifting of the belt from one cone to another, thus saving the time and annoyance due to the manipulation of change gears. The cutters are set from a fixed point, not subject to wear, and thus can always be set central with the work spindle, regardless of the wear of the cutter slide.

The feed is powerful, direct and has a wide range of evenly graded variations. It is driven by a worm and worm-wheel, which run in oil. The forward movement of the cutter slide is driven by a positive clutch, thus insuring a positive feed for the cutter, and the return movement is driven by a friction clutch of simple construction, easily adjusted by a wedge and screw which receive the shock of reversing and reduce the strain on the feed screw and working parts. The hand wheel for operating the feed screw by hand disconnects automatically and remains stationary when not in use, thus relieving the feed screw of the momentum due to a constantly revolving hand wheel or crank.

As all the working clutches are made from solid tool steel and have a large number of teeth the liability of injury resulting from the breaking or working loose of teeth is reduced to a minimum.

The work spindle slide is heavy and slides upon an upright. The slide is adjusted by a screw, operated from the front of the machine, and a dial, reading to thousandths of an inch, enables the depth of a cut to be accurately determined. The larger machines are provided with means of raising or lowering the slide by power. The diameter of the work spindle is large and amply proportioned to the capacity of the machine. Large taper holes admit the use of heavy arbors. The adjustable outer support furnished with the Nos. 4, 5 and 6 machines forms a rigid support for the outer end of the work arbor and takes all work to the full capacity of the machine.

The indexing mechanism is unusually rapid and so designed that the liability of error or failure is practically eliminated. The extreme accuracy of the index wheel, together with its large diameter in proportion to diameter of work, insures almost perfect accuracy in the spacing. The unlocking of the indexing mechanism is controlled by reversing dogs, thus admitting of very accurate timing and avoiding the necessity of a separate adjustment. When the machine is cutting, the indexing mechanism is at rest and not subject to the strains of a constantly revolving friction, and the perfection of the mechanism is such that no automatic stops are required to prevent the injury of work. The drive for returning the cutter slide and for indexing is independent of cutter drive and feed, and the return of the cutter side and the speed of indexing mechanism are rapid and constant whatever the speed or feed of cutter.

Provision is made to allow for recutting or setting a gear without loosening the gear on the arbor, or the arbor in the spindle, or slipping the teeth of the change gears. The index worm, though rigidly supported, can be unlocked by means of a lever, and drawn out of mesh with the worm-wheel by a lever, the finest adjustments made and the worm positively locked in position.

The withdrawing expansion arbor, furnished with the larger machines, can be drawn back through the work spindle, allowing the finished gear to be removed and the blank placed without disturbing any of the adjustments of the outer support or of the work spindle slide.

Adequate provision is made for oiling all the parts; the driving gears and worms run in oil, receptacles being provided for holding it. Ample receptacles are provided inside the base of the machine for catching the chips and for holding lubricant. The chips fall directly from the cutter into the receptacles, thus avoiding the necessity for an automatic device and keeping it in repair; and, when using a pump, the lubricant is taken from and flows back to the reservoir in the base, while strainers are also provided for keeping chips out of the pump.

### Compressed Air.

THE uses of compressed air are very practicably illustrated in the Burnside shops of the Illinois Central Railroad, where it is turned to account for the following purposes: Elevating sand at engine sand house, elevating oil at oil house, hoisting heavy castings and parts of machinery tools, forcing couplings on air hose, operating cylinders of hydraulic presses, removing and applying driving tires, testing water pumps after repairs, drilling with motor, topping with motor, reaming with motor, cleaning boilers, cleaning machinery, punching jacket rivet holes, taking old paint off tin roofs, rolling and bending flues, chipping, cutting, calking, small bull dozer, elevating water from deep wells, testing air and driving brakes, elevators in storehouses, operating letter presses, cutting out staybolt stubs, jacking up cars and trucks, cleaning interior of coaches, cleaning upholstered work, burning paint off coaches, painting cars, sandblast ends of cars, gasoline heater, cutting off staybolts, screwing in staybolts, rivet forges, one blacksmith forge, pressing in driving-box brasses, operating flange clamp and swedging flues.

It is considered the most efficient mode of transmitting power in and about the shop.

### A Pocket-Knife Bridge.

THERE has lately been completed in Buffalo a drawbridge so unique as to be the only one of its kind in the world. It lifts, folds as it rises and closes up precisely like a pocket knife. It has been in operation since the 20th of June last, long enough to prove its perfect adaptability to the necessities of the situation, and its smooth and noiseless operation must be witnessed to be appreciated.

The designer is John Guist, of Milwaukee, Wis. Its total length over all is 250 feet, and 500 tons of structural steel were used in its construction. Upon the bridge is a double roadway 22 feet wide with sidewalks of 6 feet on each side. It is built in two spans, each 76 feet in length, carried by two steel towers on either side. These towers are 80 feet high and contain the lifting machinery. When the spans are lifted they rise almost parallel with the perpendicular towers. A 75 horse power Kriebel engine furnishes the motive power in each elevated power-house, operating a chain and sprocket gearing attached to an immense and very powerful screw. The screw is stationed in the towers and extends to the nearest truss, passing through it at an angle of 45 degrees, just enough to give it plenty of purchase. Each revolution of the great screw draws the span inward and upward precisely as a pocket knife is closed. As soon as the weight of the span is removed from the live-load tie-bars which sustain it when down it is taken up completely by enormous counterbalances at the top of the tower, which work on a very steep incline and weigh 35 tons apiece or 140 tons in all. Steel wire cables  $1\frac{1}{2}$  inches connect the spans with the counter weights over an ingenious system of "sheaves," and the cables are also cleverly controlled so that the strain is always equal on each. The long, hinged, zigzag steel bars which unite the middle of the towers with the span fold up as the bridge is elevated, and unfold to assume the weights of the structure as soon as the spans settle and meet in the centre. Simply stated, the bridge is lifted by the engines, the weight being taken off the counterweights almost as soon as the span begins to rise. If the engines should give out there would be no harm done. The spans would be supported by the cables and could be raised or lowered by hand power from below.

The engineers claim it was a wonderful mechanical achievement to find the precise curve for the track on which the counterweights travel. These enormously heavy cylinders are at the top of the towers when the bridge is down. When it is raised they roll down on tracks, pulling at the cables and almost wholly supporting the rising structure. When the strain is first put on the cables the counterweights roll, or, rather, drop down a track that is nearly vertical. As the span rises the strain is reduced, and the vertical track gives way for a curve on which the exact balance was ascertained only after long experiment. No rule would apply to it, and in the construction of another bridge of different dimensions and weights it would be necessary to apply the same experiments. The difficulty was not only to get the exact balance, but to make it stay where it was put. The bridge is a mechanical triumph. It occupies less space for the width of the span than any other bridge that could be devised. It leaves a clear channel 140 feet wide, and takes up no more space than was occupied by the old structure which it replaced.

### Southern Iron.

MR. W. A. MOODY, manager of the Alabama Car Service Association, and agent also of the Southern Iron Committee, comprising an organization of some ten or twelve railroads which penetrate the iron section of the great Alabama coal fields, sends some interesting information to the New Orleans *Picayune*. He says: "I believe that within the next twelve months the iron traffic through this city for exportation to European markets will double itself easily. When it is remembered that this business during the past twelve months has averaged from 50,000 to 75,000 tons per month, you will probably appreciate what a doubling of the traffic will mean. As a matter of fact, the iron exports through New Orleans are a feature of your port's business which you will hardly see fully developed in several years. The products of Birmingham iron districts are creating quite a furore in European iron markets. Iron was first tried as an experiment, the fear being that it could not be used to any advantage, being mixed with the products of the home mines; but it has been satisfactorily demonstrated that it mixes well, and now they are all after the Birmingham ore. I have already protected rates for a large quantity of it. That is to say, I have guaranteed the iron people in Europe and the ship brokers here that the rates will be such and such, the figure being made to guarantee them that there will be no changes on account of the variation of rates made by the railroads. During the next few weeks I dare say there will be over 100,000 tons of iron through this city."

Mr. Moody should be an authority upon the subject, and if his prophecies are realized a great deal is in store for the Southern iron industry. This new and growing market for the output of Southern furnaces should act as a great stimulus to production.

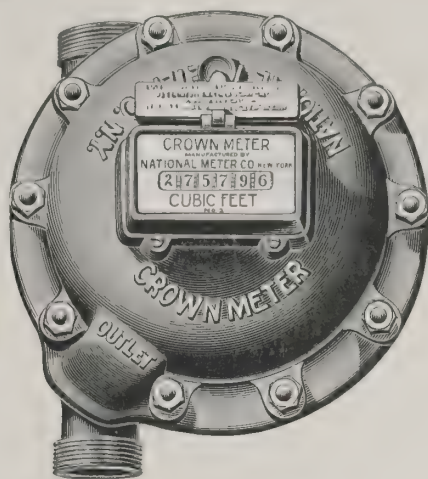
Mr. Moody is reported to have said further that brown ore is regarded as much more valuable for export purposes than the red hematite which mostly abounds about Birmingham. In this State are to be found quantities of this brown ore of a very fine quality. In Stewart County it exists in almost inexhaustible quantities, and it extends from a short distance south of Clarksville almost to the Alabama line.

A great deal of this ore might find cheap water transportation to New Orleans and iron export trade looks brighter for the South. But we hope for even a greater day when we shall export not only our crude pig iron, but the manufactured products for which it may be used.



Interesting Information for Water Works Officials about

# WATER



# METERS

They measure correctly the amount of water passing through a pipe.

**They increase the revenue,  
Restrict the waste,**

and assist in maintaining a uniform pressure in the water main.



We have many letters of similar character, copies of which we would be pleased to mail you.

## NATIONAL METER CO.

298 BROADWAY, NEW YORK.

**The Largest Water Meter Manufacturers in the World.  
Over 182,000 in Service.**

[AUGUST, 1897]

City of Highland Park, Illinois.

NATIONAL METER CO.,  
298 Broadway, New York.

GENTLEMEN:

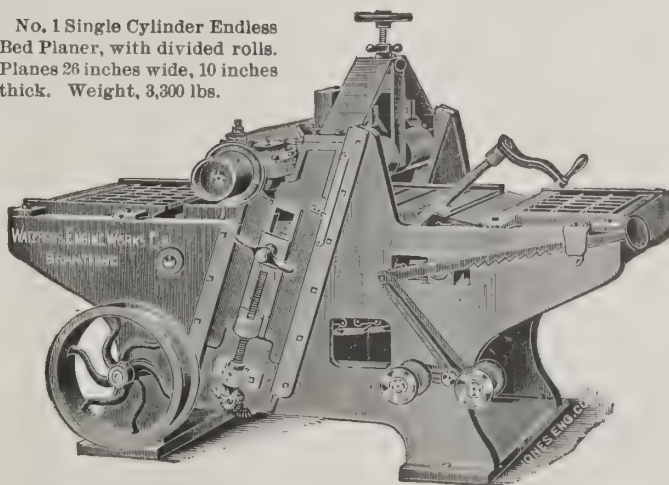
Replying to your favor of the 3d inst, would say that the city of Highland Park adopted the meter system in their water works in the winter of 1894-95. The result has been a material increase in revenue from the system, and a decrease in pumpage of at least 40 per cent. The water takers are well pleased with the service, as each pays for what he actually consumes. The city derives another advantage from the fact that leakage is quickly discovered, thereby increasing the economy of operating the system. Our experience has fully satisfied the most skeptical that meters soon pay for themselves in increased revenues on the one hand, and reduced cost of operating on the other.

Yours very truly,

J. C. CUSHMAN.

Chairman of Water Committee.

No. 1 Single Cylinder Endless Bed Planer, with divided rolls. Planes 26 inches wide, 10 inches thick. Weight, 3,300 lbs.

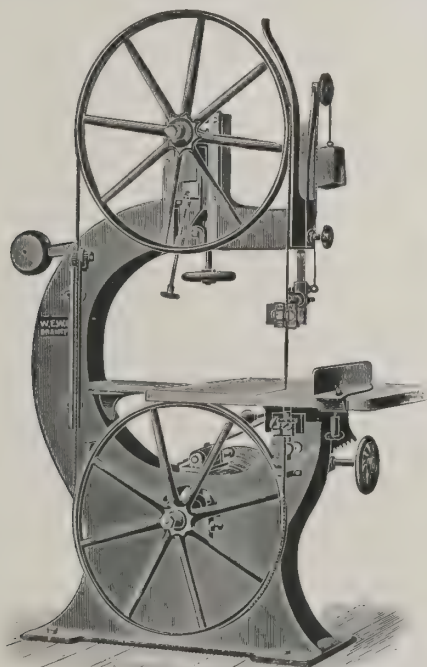


## Wood-Working MACHINERY.

No. 1 E. B. Planer. Weight, 3,300 lbs.; like cut.  
No. 1 Double Cylinder E. B. Planer. Weight, 5,300 lbs.  
No. 2 E. B. Planer. Weight, 2,600 lbs.  
"Champion" Combined Planer, Matcher and Moulder.  
Planes 24 inches wide up to 6 inches thick. Best all-around machine.

**MANY OTHER STYLES AND SIZES,  
AND FULL LINE OF  
WOOD-WORKING MACHINES.**

**Long experience in the export trade is  
a satisfactory guarantee.**



No. 3.—36-inch Wheel. Weight, 2,000 lbs.

## BAND RE-SAWS.

No. 5 Band Resaw.—48-inch wheels; saws 24 inches wide, 5 to 40 feet per minute. Resaw swings clear of machine when required. Weight, 4,500 lbs.

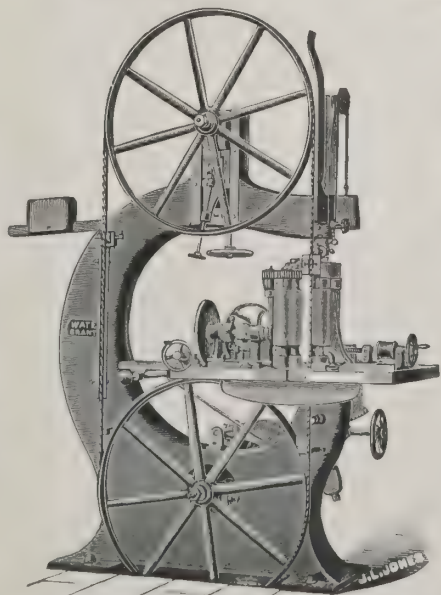
No. 6 Band Resaw.—48-inch wheels; takes saws to 3 inches; cuts 30 inches deep. Weight, 4,300 lbs.

No. 7 Band Resaw.—54-inch wheels; 4-inch saws; cuts 30 inches deep and to center of 10 inches. Weight, 5,300 lbs.

OTHER SIZES MANUFACTURED.

FULL LINE OF

**Saw Mill Machinery.**



No. 4.—40-inch Wheels and Removable Resaw. Weight 2,750 lbs.



1844.

NEW  
PREMISES.

1896.

January, 1896, we moved into new premises, securing unsurpassed facilities for executing contracts promptly and satisfactorily.

Order direct or through your commission house, sending us copy of order.

**Saw Mill Machinery Our Specialty.**

There are some 300 of our saw mills running in South and Central America, Europe, Asia and Africa, of different sizes, from those cutting logs 6 feet in diameter to small mills sufficiently portable for mule-back transport.

# WATEROUS, BRANTFORD, CANADA.



### A Gigantic Wood-Paper Machine.

THE paper company at Rumford Falls, Maine, has introduced into its extensive paper mills a monster machine which has no equal in all the world. This very interesting piece of machinery was made at Worcester, Mass. England, up to the present time, has led the world with a machine which makes paper 148 inches wide—13 inches wider than any American machine. The Rumford Falls machine will make paper 150 inches wide, 15 inches better than the American mark and 2 inches better than the world's record.

It has taken many months to build the monster and its growth has been watched with the keenest interest by the paper trade. So great was the curiosity that in one week no less than eight paper manufacturers were in Worcester to look over the world-beater. It required thirty cars to transport the machine from Worcester, and its unloading, under the supervision of the manufacturers' best men, was a task of no small proportions. The foundation for the machine was built in the most solid manner possible; though it run smoothly as a watch its tremendous weight would seek out the slightest infirmity in its bed.

When the machine gets into full operation it is expected to turn out 35 tons of finished newspaper every day. It will deliver a web of paper 150 inches wide at the rate of 500 feet per minute. In other words, it will make 6,250 square feet of paper every minute; 375,000 per hour; or, for a complete day's work of twenty-four hours, 9,000,000 square feet of paper; or, as a correspondent of the *Lewiston Journal* says, if a team should back up to the machine, fasten the end of the web to its tailboard, it would have to travel almost six miles an hour to keep the broad ribbon of paper from sagging.

Of course, there is no demand for paper 150 inches wide, but knives arranged at the tail of the machine cut the paper to the required width. The company had it built of such gigantic size for economical reasons. Space is valuable in a paper mill. The company had more room than was needed for one ordinary machine, but not enough for two; hence it planned accordingly and decided on one of monstrous size. Some of the parts of the machine weigh enough in themselves to equip an ordinary factory. The largest of the rolls over which the pulp passes weighs 5 tons, and each of the thirty-two steam driers is 48 inches in diameter.

The superintendent of the mill estimates that the new machine, taking into account the necessary increase in the way of pulp and sulphite, will probably give employment to forty or fifty more men. Just how many acres of spruce timber this monster will eat up each day is not stated.

### Compressed Air Motors.

WATER power, electric power, steam power and power derived from compressed air are occupying a goodly share of attention in the scientific world. Experiments have been made at Worcester, Mass., with a newly devised compressed air motor. A heavy carriage with pneumatic-tired wheels, and the working machinery underneath the body, made a trip along one of the quiet avenues of that city and attained a maximum speed of twenty-five miles an hour.

It has long been a pet scheme of inventors to devise some motor for carriages that while simple in design would at the same time combine the essential features of effectiveness, durability and economy. Such a motor once perfected, it is thought it would at once supersede horses for carriage and cab use in large cities.

It is stated that the projectors of the carriage air motor intend, in case of success, which now appears assured, to form a joint stock company for the purpose of running a system of air motor cabs in some of the large cities of the country. The motor carriage constructed at Worcester is the first in which compressed air is used as the motive force. All other motors derive their motive power either from a storage battery or a miniature engine.

The same works at Worcester are now building compressed-air motors for the Metropolitan Traction Company of New York.

### A Giant Seesaw.

PARIS has its Eiffel Tower, Chicago its Ferris Wheel, and the Tennessee Centennial at Nashville has as its great landmark the Giant Seesaw. This unique structure was designed and constructed by Mr. A. J. Dyer, a prominent engineer of Nashville. The tower rests on stone foundation running down to solid rock, and is 100 feet high, while the truss beam, from either end of which a car capable of carrying twenty-five people is suspended, is 200 feet long, thus giving a maximum height of 200 feet, from which point a most magnificent view can be had. The giant seesaw is operated by an electric hoisting engine equipped with a 10 horse-power multipolar motor direct connected, and is attached to the walking beam by means of gearings, which give the car a speed of 65 feet per minute. A novel method of illuminating is had by two strong searchlights, which reflect for a distance of over thirty miles.

S. K. HATAH, mechanical engineer of the Imperial railways of Japan, paid a visit to Wilmington last month to inspect the two car-building shops of that city. Mr. Hatah expressed himself as highly pleased with all he saw. Before leaving he made the significant remark that some 400 cars were needed in Japan, and if the recommendations relative to the Wilmington car builders proved true, there was every likelihood of the local companies getting the contract.

### A New Water-Power Machine.

BUFFALO is about to make further use of the Niagara River as a generator of power for manufacturing purposes. Below the falls there is a long narrow gorge down which the river flows with great force, and this current is to be turned to some account. At one time a reward of \$100,000 was offered for any apparatus that would successfully accomplish the purpose.

Sylvester N. Stewart has invented a horizontal shaft with paddles arranged in the form of a spiral which, by trial in the current, has proved effective. This apparatus has been exhibited before committees of the Merchants' Exchange and Real Estate Exchange, who have given it their approval and commendation, asking the general, state and municipal governments to grant privileges that will permit its use in the Niagara River. Application has been made to the State Board having in charge the breakwater pier running between the river and Black Rock harbor for permission to take the apparatus on such pier; and if such application is granted, and the use of the current permitted where navigation will not be obstructed, it is expected that power will be generated for public use at a very low cost. If such permissions are obtained it will be agreed that power shall be furnished at \$20 per horse-power per year for 24 hours' use each day.

Stewart's machine is simply a continuous screw of paddles or blades set about a long shaft and arranged to be depressed or lifted as the conditions of the river may demand. The right they ask for is to set a row of steel posts out a few feet in the current on which they can build a superstructure as a house for their dynamos, and underneath this house they will place their motors. The current will flow freely under the structure, and it is said there will be no impediment or dam to the flow of the water save that which is checked by coming against the paddles of the screw.

The current of the Niagara at the entrance opposite Buffalo is very rapid, and, if it can be utilized for the development of power, similar motors could probably be used with good results at several other points in the stream.

### The American Institute Fair.

MACHINERY in motion will probably prove the most popular phase of the 1897 American Institute Fair, to be held September 20th to November 4th, at Madison Square Garden, New York.

Aside from the interest inspired by a higher intelligence and a serious purpose, it is human to like to see the wheels go round. The American Institute's Fair managers are striving to make the 1897 Fair the most important and best in the Institute's long and honorable record of seventy years.

Of all departments, the management earnestly desires that of engines and machinery to be the strongest. It embraces the vast variety of inventions which include as main features stationary engines moved by steam, gas, water or wind and all their accompanying contrivances, pumping machinery and all pertaining to it, including steam fire engines, iron and woodworking machinery and tools, textile and paper machinery and that used for the manufacture of leather, rubber and for grinding and crushing mineral, grain and spices. Gearing and all elements of moving machinery are included in this department.

The electrical section will include everything pertaining to telegraphs, telephones and their construction, signals and alarms, electrical, medical and surgical apparatus and instruments, motors, electric lighting devices, and models of or apparatus and instruments used in electrical processes.

It was the American Institute which in one of its fairs first demonstrated to the doubting world the practicability of Morse's electric telegraph and other less important but important electrical inventions.

The Fair's management has also planned as an especial attraction to the public a flower show which in extent and cost has never been equalled. It will be scientifically classified and a wide range of species of plants will be accessible to lovers of flowers. The show of fruits, nuts and vegetables, too, will be the most complete ever seen in New York City. All inquiries for information should be addressed to Alfred Chasseaud, general superintendent of the Fair at Madison Square Garden, New York City.

### New Lingo for Looms.

MR. GEORGE W. STAFFORD, of Providence, has invented a lingo for looms. It was designed to meet the demand for a lingo having a spring-head which permits the loop of a heddle to be connected without any difficulty, which does not tend to cut the loop, and which does not exceed in its proportions in cross-section the proportions of the body or lower portion of the lingo to take up room laterally or interfere with the vertical movements of the lingo when grouped with a number of others, as occurs in practice in Jacquard looms.

The improved lingo is formed of wire of suitable cross-section. The upper end or head part is swaged to a reduced diameter. Then the reduced head is flattened at the end for a sufficient distance to constitute the spring-tongue of the completed lingo, and also throughout the back portion of the head opposite to the spring-tongue, the wire being left round throughout the entire length of the bend or neck of the head. Then the head is bent upon itself in the round neck until the tip of the tongue has been brought very close to or against the back of the head.

The completed lingo presents a spring head in which the wire is swaged to a smaller diameter than the body, it having a flattened tongue, an opposing flattened back part and a neck of circular cross section. The neck is wholly free from any edge such as would tend to cut the loop of a heddle.



Absolutely noiseless,  
Immediate and strong siphonic action,  
With a cistern valve that can be regulated  
for any discharge,  
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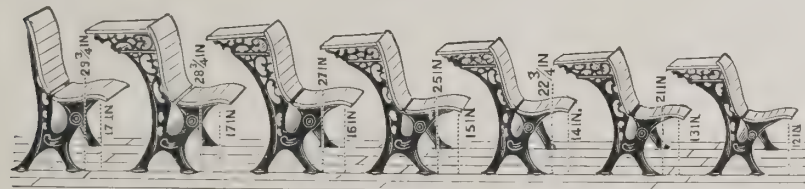
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Jersey City, N. J., U. S. A.

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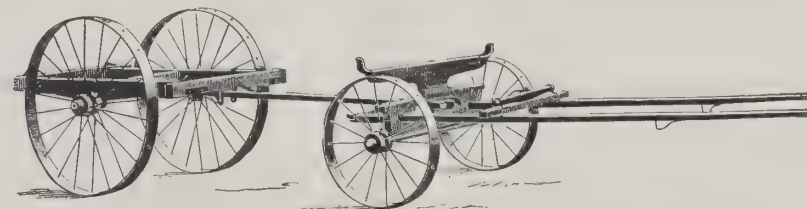
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CHARLOTTE, MICH.,  
March 17, 1890,

C. A. WOOLSEY,  
Dear Sir:—We have used your colors for the last two years and we like them better than any we have ever used. Your Black, Wine and Greens are very fine colors, being very finely ground and having a good strong body. Your Ruby Red, we think, is the finest Red in the market, and full as nice as Carmine.

Yours truly,  
MAY & BARNEY.

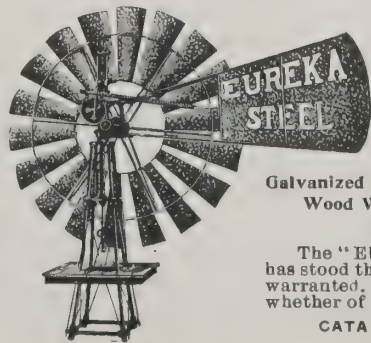
THIS CART is used for hauling lumber and various other material. One horse with forward truck will keep ten or a dozen rear trucks employed. The load is balanced on rear truck. When the two trucks are coupled together they make a complete lumber wagon.



No. 1 LUMBER CART.

This cut shows the two trucks coupled together, the same as an ordinary wagon. The reach has a hook at the end to hook into the draw staples of the rear truck.

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### Machinery for Russia.

MR. FRED. J. MILLER, editor of *The American Machinist*, New York, writes a series of most interesting letters from abroad dealing with American trade in that class of goods in foreign countries. He concludes with Russia, and in reviewing the situation there speaks most hopefully of the progress made, especially by the American makers of large machine tools. Lately a large consignment of locomotives was sent from Philadelphia for the use of Russian railroads. This shipment has been followed up by an entire equipment of tools for an immense new establishment for locomotive building in the same country. The new locomotive shops in Russia are, we believe, operated by the Russian Government, which also controls the railroads. One of the most important railroads of the world is the Siberian road, now under construction by the Government. Exclusive of tributary lines, it is to be 10,000 versts long or about 6,660 miles, and in conjunction with the roads of China will open up vast territories.

Mr. Miller tells an amusing story, and one with a moral to it, in relation to the effect of governmental control of machine shops in Russia. He says:

"I heard of one man here (Moscow) in charge of a mechanical department who wanted for that department a certain fine lathe, quoted at a price which he knew would not be sanctioned by the officials above him. So a requisition was made out for certain lathe parts, which parts were furnished separately and a bill made out for each one, the aggregate amount being equal to the price of the machine. The parts were supposed to be required for repairs and renewals, but upon arrival were promptly assembled and a new lathe thus secured."

The lathe was an American tool and will no doubt give such a good return for the expenditure that in future the overseer will not be compelled to resort to such subterfuges in order to duplicate the machine.

The manufacturers of machinery in this country, on taking off their balance sheets for the past year, were amazed to find what an important feature their export orders had become. One large machine tool works in the West held its annual meeting a few days ago, when a handsome dividend was declared; and the president of the company informed the stockholders that "75 per cent. of the gross receipts had come from foreign orders." These, principally, were large machine tools. In 1896 an address was delivered to students of economics in the University of Pennsylvania on the "Future of American Industries," in which the changed industrial conditions were first brought to public attention. While the statements then made caused much surprise, the predictions have been more than verified by recent developments.

### Laundry Machines.

CERTAIN business transactions between this country and La Belle France, while redounding to the credit and profit of the former bring to us a certain feeling much akin to regret. It would seem that a unique and romantic feature of the Quartier Latin is gradually passing away in the person of our esteemed and cherished friend la Blanchisseuse. Ever since the days of Madame Sans Gene, and at the time too when Trilby reigned, we have had a warm corner in our hearts for her, and while we yield to the heartless exigencies of dollars and cents we shall be very sorry to lose her. She is to be driven out of France to make way for American laundry machinery. A complete plant has been recently purchased here for prompt shipment to France. According to the purchasers it is the intention of a private concern in an interior town of France to start a laundry plant on a large scale. After having investigated all the various improved laundry machinery it was found that a concern in the western part of this country made the most improved kind. The value of the contract is given at \$42,000, but no particulars are available until the machinery is ready to be shipped, which will be in about ten weeks. That this industry is making headway not alone in France, but in Great Britain and Germany as well, is evidenced by the following clipped from the pages of the *London Laundry Journal*:

An oft told tale is that of a boy, being asked where Ireland was, replied:

"In America, sir."

"No, no," replied the pedagogue, to which the youngster retorted:

"Well, sir, it very soon will be."

This will be the case with American laundry machinery dealers, except that England must be read for Ireland, and the positions reversed, who are all apparently coming over to this country, swamping us with American machines, and it is not only this country that the enterprising Yankee is invading, but Germany and France as well. In the former country a very large business indeed is being done, the German engineers being very far behind our own in this particular industry.

### Anti-Friction Steel Direct from Molten Pig Iron.

A SUCCESSFUL test was made at Springfield, Ohio, in the early part of July last, of a process of making various grades of anti-friction steel direct from molten pig iron. The first successful test was made in the factory of Governor Bushnell, chief magistrate of the State. Both of these tests had been looked forward to with considerable interest, and were attended by many leading capitalists and manufacturers. John B. Hastings, of Bellaire, Ohio, is an old iron worker of forty years' experience. Associated with him are Messrs. J. Bold and Charles Koplin, both of Bellaire. It is likely the idea will soon take practical shape in the establishment of a plant for the manufacture of steel by this process.

### American Locomotives.

THE United States have won a very speedy recognition in the locomotive industry. There is scarcely, in fact, a branch of foreign trade that has developed quicker. The *Scientific American* remarks that not many years ago the foreign locomotive trade was almost entirely in the hands of European manufacturers, and the American locomotive was an unknown quantity outside of the United States. The causes were not far to seek. In the first place, the large colonial interests of the European nations brought them into close contact with foreign States and peoples, who had the opportunity to see the European locomotive at work, as it were, at their very doors. On the other hand, the development of the railroad system of this country was so extraordinarily rapid and produced such an enormous demand for locomotives that our manufacturers were fully occupied in supplying the home market. Of late years, however, the rate of railroad construction has been steadily reduced. The older roads have become thoroughly equipped with modern and more powerful locomotives, and the demand for new stock has shown a relative decline.

One natural result of this has been to cause our builders to give increasing attention to the foreign markets, and a very successful attempt has been made to introduce the American locomotive in those countries which have hitherto been exclusively controlled by European builders. Our success has been greatly assisted by the fact that the American built machine is specially adapted to the requirements of foreign railroads. It is strong in those points in which the other type is weak.

In response to our inquiry we are informed by a leading firm in this country that, while for the past two or three years the export trade in the aggregate has not been as large as in the few years preceding, there are signs that it is again on the increase. This falling off was not due so much to any relative decline in this trade as compared with the export trade of the country in general, but is attributed to the general depression which has marked the trade of the world at large. As a matter of fact American locomotive builders are just now receiving inquiries from more foreign countries than ever before in the history of the trade.

### A Magnetic Drill Clamp.

MAGNETS for lifting purposes as a substitute for clamps are now becoming pretty general, and the ease and facility with which a five ton casting can be picked up and carried about a shop is very striking. Under old conditions it was necessary to bore holes in the metal to be raised in all sorts of odd and inconvenient places and angles. Very often it was necessary, too, to attach clamps for holding the drilling machine to its work. The application of the portable electric motor for this purpose was a long step in advance, and the method proved of great service in dealing with the armor of the new American cruisers. When, however, a portable drill is completed with a magnetic clamping device the ideal conditions are realized. Placed fairly upon a mass of iron these drills have an adhesive force of nearly half a ton each. It is, then, a simple matter to adjust and clamp the drill by merely turning a key. Then it will start in to bore holes up to an inch in diameter as fast as it is safe to work it. These portable drills in small sizes, particularly with magnetic clamp attachment, will be found invaluable in general machine shop practice and in modern building work. The whole apparatus weighs but 200 pounds.

Another clever application of the magnetic principle is in use in the works of a large steel company at South Chicago. In the rolling of boiler plates the resulting sheets, twenty or more feet long and weighing from a quarter to half a ton, are very difficult to handle, and when they must be moved are very difficult to sling. A pair of powerful electro-magnets was rigged up and attached to the travelling crane. Now all that is required is to drop these magnets down upon one of the long plates, which is thus held at two convenient points, and to send it flying down the room and drop it into place without a jar, saving a great deal of labor.

### Iron Pole Climbers.

A POLE climber for use on iron telegraph poles, and which is at present used in connection with the military telegraph lines in the Western part of the United States, is described in the *Electrical Engineer*. These consist of a wrought-iron collar which locks around the pole and two steel footrests; two bolts for holding the collar and footrests together, and two toe straps. The foot pieces are about seven inches long and bent at the inner end, which is serrated to form a dog. The foot pieces are fulcrumed upon the bolts, and when in a horizontal position the serrated ends clutch the pole, but when lifted permit the whole device to lift up or down. The lineman inserts his feet in the straps, grasps the pole and, holding himself to it, lifts his feet up, after which he allows his weight to again fall on the footrests which clamp the pole. He continues this until he reaches the top, where he stands on his footrests and adjusts the line or makes the needed repairs.

THE San Francisco *Chronicle* of July 22d gives an account, with illustrations, of a harvester being used by the Wood Brothers on Roberts' Island, near Stockton, Cal., that cuts a swath fifty two feet wide, threshing and delivering in sacks. Its capacity is about 100 acres per day, with from eight to ten men and a big traction engine to handle it. It is said to work well, operating in the heaviest wheat without difficulty, but "it is not very easily handled on the road."





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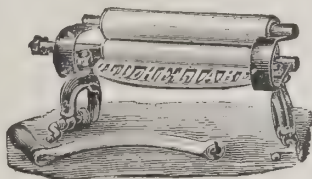
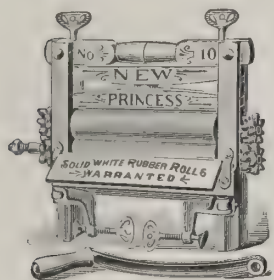
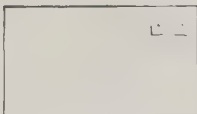
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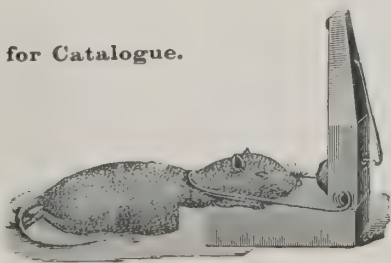
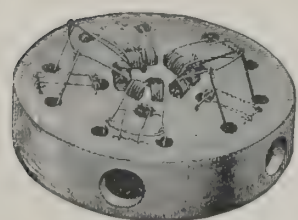
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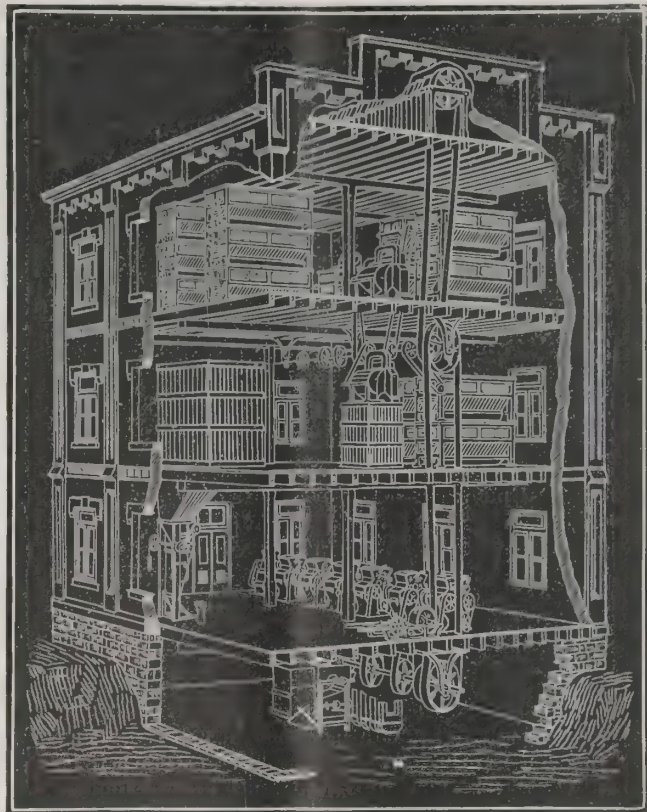
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Orders filled through commission houses.

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### American Cars for England.

A PROMINENT car company of Wilmington has been awarded a contract to build a number of cars for the Southeastern Railway Company of London. A few weeks ago a sample car from the Wilmington works was received in London and the Board of Directors were so much pleased that the contract was at once awarded. The American firm has lost no time, and an extra force of men has been put upon the work with the hope of finishing the last car of the order before the close of the Summer. This is the first contract the company has received for export in England, and they intend to do themselves proud. For their own credit and profit, and for the honor of the American craftsmen, the workmanship and finish will be as perfect as ingenuity and skill can make them.

The sample car which is now in use on the line of the Southeastern Railway Company is fifty-five feet long and of standard width. It is the regulation parlor car of this country. It is not divided into compartments, as abroad, and the entrances and platforms are on the ends. In fact, to all intents and purposes, it is the everyday American car with Gould vestibules and couplers complete; it is fitted, however, with the wide English buffers.

Below the middle of the car is a box holding the accumulators for lighting by the Stone electric system. The frame wood is of teak and to insure a long life, barring accidents, the outside is built of the finest quality of mahogany. The exterior is colored a beautiful claret, richly decorated with gold leaf and delicately shaded. Upon the sides stand out in clear gold letters the name of the company and the words: "First Class Car."

On entering one passes into the ladies' drawing-room, which is finished in prima vera, usually called white mahogany, and upholstered in blue. Thence the main saloon is reached, which occupies the full width of the car. This commodious parlor is furnished with high backed seats similar to those used in the sleeping cars of this country, and is finished in Mexican mahogany. In rear of this apartment is a large and elaborate smoking-room finished in quartered oak, with cushions and chairs upholstered in leather.

The Southeastern Railway, on which this car will run, is one of the great railroads of England. It connects with various seaports where boat connection is made for the Continent, and is, therefore, much used by tourists.

In ordering the company desired to have a car which would have the combined strength of the English-built carriage and the convenient arrangement of an American car. That the idea has proven a success follows from the substantial order received, and it looks as if American ideas for comfortable transport were about to take root on the Continent.

### A New Fire Nozzle.

AT the Firemen's Convention, which met at New Haven, Conn., on the 17th inst., a new hose nozzle for fighting fires was exhibited. The invention will, it is declared, enable firemen to enter buildings no matter how hot or full of smoke they may be. The nozzle is about 30 inches long and will stand a pressure of 250 pounds. It will produce either a solid stream, a spray or a solid stream and spray simultaneously as may be desired. A spray ranging from 75 to 100 feet in radius and thrown at any angle desired can be cast by turning a small knob. The solid stream issues from the centre of the nozzle, and a little in front of the outlet of the spray. The spray can be used as a screen against advancing fire and smoke, or else be turned back on the fireman, in this manner protecting him from falling cinders. A fireman can stand in the window of an adjacent building threatened by fire, and, with the spray, protect and wet down the side of the building in which he stands, and at the same time throw a powerful stream from 1 to 2 inches in diameter upon the burning structure.

"The nozzle," said the owner of the invention, "will give a backward spray which will cover with water the fireman at the same time that it pours a stream upon the blaze. With this spray to protect him a fireman may approach as near to the flames as he desires. By turning a crank the angle of the spray may be changed and made to play directly over the fireman in the shape of an umbrella. The weight of the nozzle is supported by an iron pedestal, which is adjusted to two small sockets. The end of the pedestal, which is pointed, will be driven into the ground by the force of the water, forming in that manner a firm rest for the nozzle. A single man can then easily handle and direct the nozzle."

### Electricity Saves Waste Power.

MR. A. M. LOZIER, M. E., in a recent article for the *American Machinist*, says: "When electrical transmission stepped to the fore, even the best-equipped factories presented a most inconsistent appearance. This condition might be compared to two strong iron links of a chain held together by a piece of string, for on one hand their boilers and engines were of the best and most economical types, and on the other hand their tools or printing presses were compact, automatic and highly efficient. But the connecting link, the means of transmitting the power from the engine to the tool, was a weak one, a great source of waste of power and a relic of conservatism. It is astounding that for years, thousands, indeed one may say millions, of horse-power hours have been wasted in the mere friction load of shafting and belting without any serious consideration of the matter by mill owners and printers. Records of tests made in over 200 representative factories and printing establishments of this country alone show as an average, that about 50 per cent. of all the power generated by the engines has been wasted in belt or rope transmission of power."

### Fish Culture.

FISH COMMISSIONER BRICE of the United States is authority for the statement that Woods' Holl Station in Massachusetts is now the most important fish culture establishment in the world, and that the near future will even show a much larger expansion of the work of propagating marine food fishes.

A quarter of a billion of eggs of economic species were taken at this station during the fiscal year just closed. They consisted of cod, lobster, mackerel, tautog, flatfish and other species.

In a published letter upon the subject Mr. Brice says: "The changes which I have brought about in some of the methods of conducting the work cannot fail to produce better results. Thus, in the case of cod artificially hatched, the practice now is to plant the fry on the grounds where the eggs are laid under natural conditions, and instead of planting the young lobsters at the surface in swift currents, they are now taken to quiet points along the shore and lowered to the bottom in places where experience has shown the adult lobsters resort during the hatching of their broods. The plan of imitating nature as closely as possible is followed in our work, and in so doing we cannot go astray."

"Within the next four or five years it is confidently anticipated that, as a sequel of the very extensive and intelligent work now being done at Woods' Holl and Gloucester, lobsters will be more abundant on the Massachusetts coast than ever before, and similar results are expected on other parts of the New England coast to which the operations of the commission have recently been extended. Five times as many lobsters are now artificially propagated annually as were propagated during the entire twenty years of the commission's existence. In the attempts to maintain the supply of fishes by artificial means it is necessary to prosecute the work on a gigantic scale in order to procure tangible results; this is especially true of marine fish culture."

"It is my purpose to organize at Woods' Holl a corps of scientific workers to whom the commission will extend every facility for study along the lines laid down by this office in the direction of the practical work now being carried on. These persons will be professors and graduates of high reputation, whose researches will prove of great economic as well as scientific value. Owing to the growth of the fish culture work at Gloucester it has become necessary to enlarge the station, and a regular superintendent instead of a foreman will hereafter be in charge. The increase in force necessitated by that development of the work is provided for by the transfer of skilled employees from other stations at times when their services are not there required."

### New Method of Lighting and Heating Cars.

THE PULLMAN CAR COMPANY, of Chicago, have adopted a novel and most expedient way of lighting and heating their cars by electricity. The mechanism of the apparatus too is very simple. To the car wheel is attached a gear wheel connected by ordinary cogs with the shaft of a one-horse-power dynamo which is securely placed upon the car truck. By this means a constant and reliable electric current is generated which is passed through a small storage battery, whereby the light is rendered both bright and uniform even when the car is at a standstill. Each car is thus independently provided with its generating and illuminating apparatus, so that cars may be detached from through trains when desirable and sent over connecting roads without limitation. All the mechanism is securely placed beneath the floor of the car, completely incased to avoid dust and dirt. The apparatus weighs less than 500 pounds and is automatic in operation, thus requiring no personal attention except at long intervals of time when regularly inspected at terminal stations. The mechanism is plain, simple, strong and permanent in character and not liable to suffer from friction or depreciation, and the many difficulties which have heretofore embarrassed the use of electricity for car lighting are wholly and effectually solved by its use.

### Shipments to Argentine Republic.

TRADE with the Argentine Republic has recently been rather brisk in the line of railroad construction material from this market. Most of it, according to a leading export merchant, is purchased now directly from the various manufacturers and is shipped by them with a sight draft attached to the bill of lading.

This would indicate a period of prosperity and an easier money market with the people of our sister Republic, and it is to be hoped that the new method may continue. It is expected through the crop failure of this and last season there must naturally be a falling off in the business of agricultural machinery. In speaking on this subject two local export representatives for leading agricultural implement manufacturers agreed that though business had already fallen off there was still considerable trade done. The last good-sized shipment that went forward was harvesting machines, on the bark John S. Emery, which sailed a few weeks ago. Its value was \$18,000. One of these representatives said that there was about \$8,000 of unfinished orders on hand, and when these were completed it was not likely that another order would be received for some time.

Among the balance of the John S. Emery's cargo were hay forks to the value of \$5,000, iron-pipe valves and steamfitters' utensils \$9,000, twine \$11,000 and hardware upwards of \$8,000.

—We are to ship thirty-five tons of steel rails to India as soon as we can get them ready. We trust that our English cousins will not consider this as poaching upon their private preserves.



American shoemakers and shoe-menders have got ahead of you. They don't buy whole sides or sole-leather now.

A shoemaker wants 2 or 3 grades and 4 or 5 thicknesses.

We cut sides, make 8 grades and 15 thicknesses, sell the cobbler the grades he wants, and the rest, including the waste, to somebody else, who wants that.

Prices depend upon thickness and quality.

All well served; no waste; no using leather because you've got it.

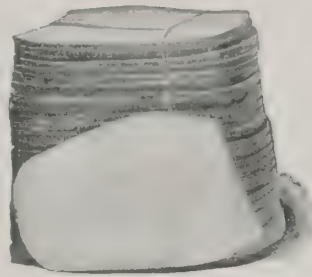
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Sample dozens may be ordered of any export house

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Quality.	Thickness.	Hemlock.	Oak.
Prime	5/16 inch	\$2.22 doz.	\$2.52 doz
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	1/2 "	1.80 "	2.10 "
	5/8 "	1.62 "	1.80 "
Good	3/4 "	2.01 "	2.11 "
	7/8 "	1.83 "	1.92 "
	1 "	1.65 "	1.74 "
	1 1/8 "	1.48 "	1.54 "
Medium	1 1/4 "	1.80 "	1.94 "
	1 1/2 "	1.68 "	1.80 "
	1 3/4 "	1.50 "	1.62 "
	1 7/8 "	1.32 "	1.48 "
Coarse	2 "	1.42 "	1.50 "
	2 1/8 "	1.32 "	1.38 "
	2 1/4 "	1.20 "	1.26 "
	2 1/2 "	1.08 "	1.14 "
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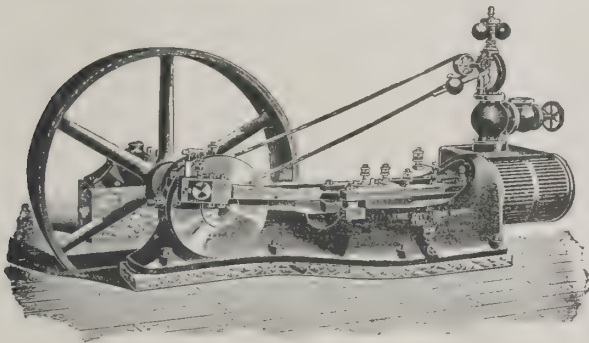
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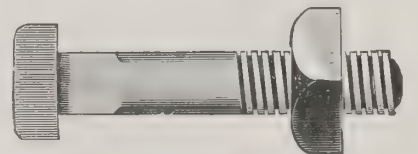
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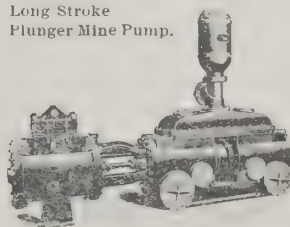
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Card and Paper  
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SMALL HAND PRESSES, simply arranged with type for any language, by which any person can do good printing. Typesetting perfectly easy, to even a boy, with our printed instructions sent with every press.

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No. XX Press prints cards, circulars, etc., up to 5x8 inches. Complete with 7 styles type, ink, etc. Price, \$40.00. This outfit is entirely complete, ready for use.

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Please write for our Illustrated Catalogue, by mail, of Presses, Type, Paper, Cards, etc., direct to our factory, near New York.

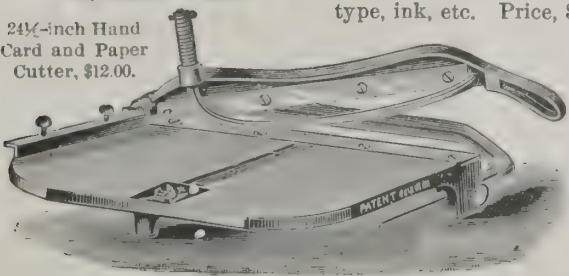
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A larger machine for fast work. Chase, 9x13 inches. Weight, boxed, about 700 lbs. Price, only \$100.00. Price, \$200.00, if complete with type, ink, and all fixtures for general printing.





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Bottom on  
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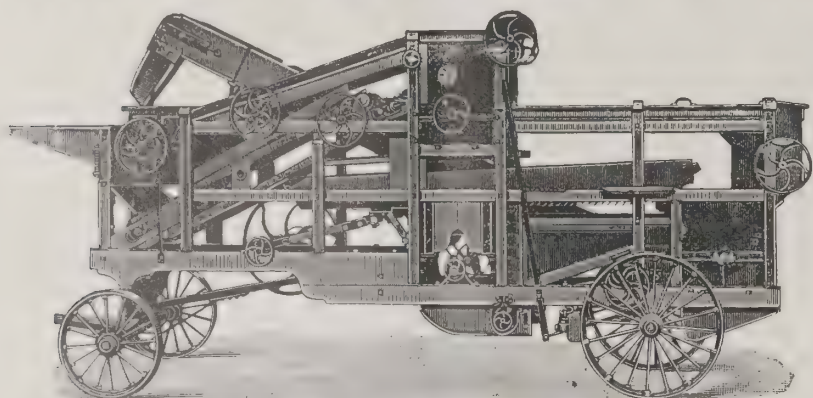
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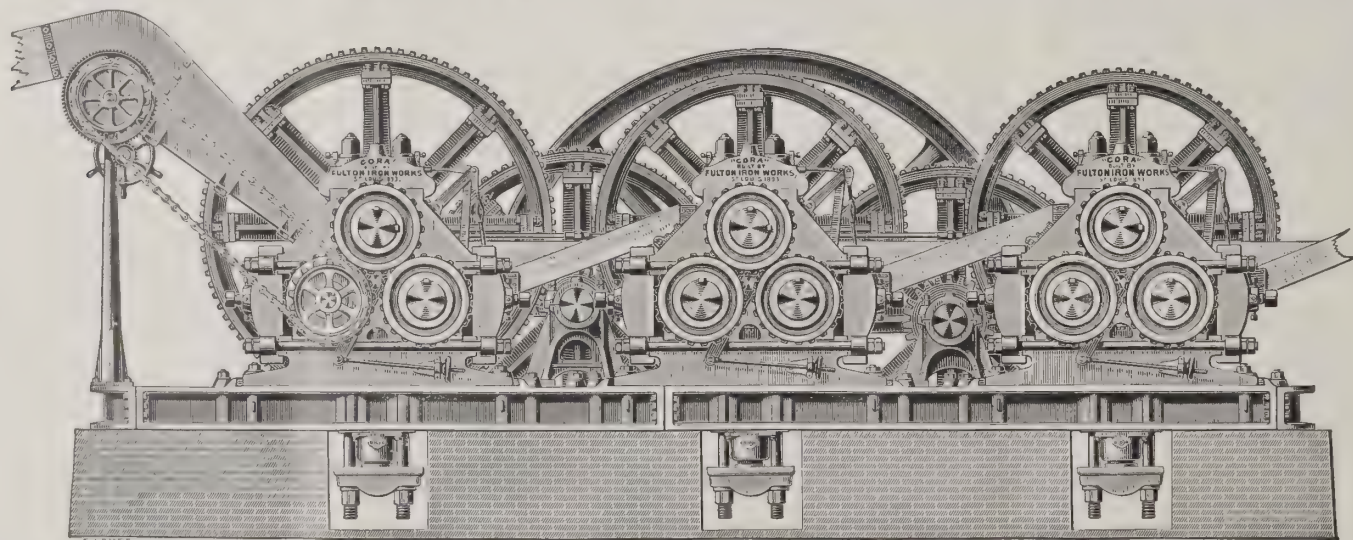
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# "CORA" Nine-Roller Cane Mill.

CORRESPONDENCE SOLICITED.



ESTIMATES FURNISHED.

Built by "FULTON IRON WORKS," St. Louis, Mo., U. S. A.

Per S.S. "COPTIC"

FULTON IRON WORKS, St. Louis, Mo.

HONOLULU, H. I., June 17th, 1895.

Dear Sirs: The nine-roller mill and Corliss engine built and erected for us by you last year has given perfect satisfaction, and we take pleasure in furnishing you with the following report covering work performed by it during the season just closed. Days grinding, 104 $\frac{3}{4}$ ; Tons of cane ground, 61,617.928; Tons of cane ground per day, 588.238. Extraction: 92.49 per cent. total sugar; 82.13 per cent. of cane; Dilution, 7.91 per cent.; Fibre in cane, 11.02 per cent. Average load on hydraulics, 313.2, 334, 344.5 tons.

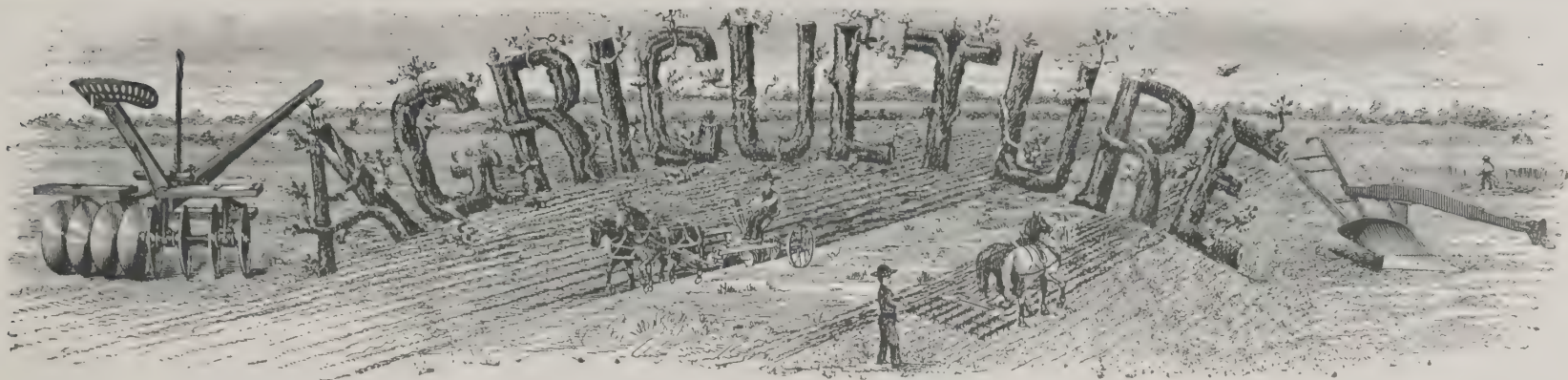
It is hard to say just what is the capacity of this mill, as our boiling house is not of sufficient size to admit of a prolonged test, but we would say that we have ground on a short run over 50 tons of cane per hour, and with an increase of from 50 to 75 tons in the load on the hydraulic obtained an equally good extraction. We believe we have the best mill on the Islands.

Very truly yours,

EWA PLANTATION CO.,

E. D. TENNEY, Secretary.





DEVOTED TO THE FOREIGN TRADE IN AGRICULTURAL MACHINERY AND IMPLEMENTS

### A New Cattle Food Product for Export.

INDIAN corn is the greatest cereal in extent of crop grown in the United States. In spite of the many efforts made to utilize its waste product, the cornstalk, it has been an incumbrance to his fields which the farmer has removed frequently by fire as being the cheapest and best way in which to dispose of it. The outcome of a recent invention has changed all this. Through a successful effort to produce corn stock pith cellulose a way has been found in which to prepare a valuable food product from the stalk after the pith has been separated from it. In the process of the extraction of the pith the blades and husks are first removed and the stalks are cut up in small pieces. After the pith is extracted the remainder of the stalk is ground up into meal, which in general appearance resembles coarse bran, dried malt sprouts, or brewers' grain. This material, called "new corn product," has been made the basis for an exhaustive investigation of its value as a food product for cattle by Mr. Harry J. Patterson, B. S., Vice-Director and Chemist of the Agricultural Experiment Station for the State of Maryland, selected for this purpose by the United States Department of Agriculture. The statements contained in this article are taken from his official report.

Corn stock pith makes up the greater part of the plant by bulk, but it is only one-fifteenth part of it by weight. This pith is poor in food components, but it has the capacity to absorb fifteen times its weight of water, and exerts this ability when taken into the mouth and stomach and takes to itself an undue proportion of the digestive fluids, which leaves an insufficient quantity to act upon the portions of the plant which are richest in food constituents. Consequently the richer parts of the food pass the stomach incompletely digested. This is the reason assigned for the value of the cornstalk as a food product when properly prepared after the pith has been removed and demonstrates why cornstalks when containing the pith could not be so used.

The experiments were made with four steers and covered preliminary feeding periods of from six to eighteen days, and digestive periods of from six to seven days, when testing rations to compare the digestibility of the new corn product with shredded corn fodder; with corn fodder ground fine; with new product fed wet and fed steamed; with corn blades; with wheat bran; with a ration of equal parts of shredded corn fodder and wheat bran; and with fattening rations—new corn product base *vs.* corn blade base, and the use of the new corn product for producing fat. The latter test covered a period of sixty days.

The results of all the tests show this new corn product to be a valuable food stock. It is richer in composition than the whole fodder, and the food compounds are more digestible. It contains more pounds of digestible food per hundred pounds of the original feed than does whole fodder, corn blades or timothy hay.

Rations compounded with this new corn product as a base are eaten well by cattle. They are more digestible than the same grains fed with fodder blades and will produce more gain in live weight per hundred pounds of food than the fodder blades ration. The rations are more easily fed and there is less waste than in feeding in the ordinary manner.

This new corn product can be easily and uniformly mixed with any kind of ground grain or any of the by-product cattle feeds common in the markets. By the use of this new product as a base it is possible to mix a complete and normal ration for stock in one bulk and which can be fed at one feeding, so avoiding the necessity of feeding grain and hay separately. This has been impossible with any class of food products in the shape in which they have been prepared for market. Rations mixed in this manner are as staple and possess as great keeping qualities as cottonseed meal or wheat bran. Animals fed upon such rations eat them with relish and keep in normal condition. Cows and steers will lie down and chew their cud as naturally as when fed on hay or in pasture.

#### SUMMARY OF ESSENTIAL RESULTS.

The tests of this new corn product show:

1. That it contains 11 pounds per 100 more digestible matter and 2 pounds per 100 more digestible protein than the whole fodder shredded.
2. That it contains as much digestible matter per 100 pounds as corn blades.
3. That it contains 3 pounds per 100 more total digestible matter and  $\frac{1}{2}$  pound per 100 more digestible protein than timothy hay.
4. That it contains within 1 pound as much total digestible matter as

wheat bran, but less than  $\frac{1}{3}$  as much digestible protein; consequently the nutritive ratio is wider.

5. That there was more digestible matter in a fattening ration with this new product as a base than where the same grain mixture was fed with corn blades.

6. That animals fed with a fattening ration with this new product as a base made more gain in live weight and upon less feed than with a fattening ration of the same grain and corn blades.

7. That rations made up with this new product can be fed with less labor and less waste of food than when hay and fodder are fed separately as ordinarily practiced.

8. That the keeping qualities of the new corn product are as good as linseed meal, cottonseed meal or wheat bran.

The importance of this achievement cannot be overestimated for the reason that this product not only forms by far the cheapest and most nutritious food for cattle and other live stock, thus supplying animal food of all kinds, and cheaper meat for home consumption, but will through its use successfully compete with the world in supplying food for export.

The field for the production of the Indian cornstalk in the United States is practically unlimited. In 1895 it was estimated that fully 160,000,000 tons of cornstalks went to waste, while every year the acreage of cultivation is increasing.

The markets of the world are always open to receive and pay for any raw or manufactured commodity that can be produced cheaper than that already in consumption. Consequently, as this new corn product is both superior and cheaper than that at present in use for similar purposes, it is expected that it will find an immediate and continually growing export demand.

### California Fruit in Paris.

CALIFORNIA fruit growers and packers are very much gratified by the statement made by Mr. Raphael Weill who has recently returned to San Francisco after a sojourn of eleven months at the French capital. The information he brings is interesting. This is what Mr. Weill has to say of the extent California fruit is appreciated by Parisian connoisseurs:

"During my recent visit to Paris I was very much gratified to find such a demand for California canned fruit by the very best people in Paris, much more so than I had noticed during any previous visit. Parisians are slow to admit the superiority of anything outside of their own making or production, but the leading grocer of the French capital, who occupies the same position in his line as does the Bon Marché in the dry goods line, keeps a full line of the choicest California canned fruits, and he has quite a demand for them. Only the swellest clubs, hotels, restaurants and private houses indulge in these luxuries, which command a much higher price than the French goods do. It does a Californian good to see a French housewife of the very best families call at her grocer's for California fruit. They have learned the desirable brands and ask for 'Bartlett pears' and other varieties, the names of which they have learned from the labels. I have found California canned fruit in the finest hotels in England, Scotland and Germany. For our choice fruits there is certainly a market abroad, but it would be folly to try to foist goods of inferior quality upon these people, as their own products take the place of anything of ordinary quality at much smaller cost."

### Apples.

AMERICAN apples are finding great favor in Germany, and last May, when native fruit was scarce and too poor to be counted a luxury, a Berlin paper said: "But the American apple that began to come last Fall and conquered the German market has not only reappeared, but is coming in enormous quantities. Last week saw 5,000 loads of beautiful red Baldwins loaded in the wholesale houses in Berlin and sold, according to quality, for from 15 to 35 cents per pound. It looks, too, as if American apples were to continue coming, not only during the next thirty days, but, experts say, even up to the arrival of continental apples next Fall."

The dried and canned fruits of California and the Atlantic States have also for a long time now found a ready market in Germany. Their consumption is increasing steadily year by year, and this late introduction of best American apples is likely to develop and strengthen the trade and to create a permanent and important market for American fruit.



### Butter and Cheese.

AS the result probably of the visit of Mr. McKnight of Liverpool, in the interests of English traders in dairy produce, to which reference is made in another column, Secretary Wilson has been making important experiments in shipping American butter to England, and thus far has been very successful.

The result of these experiments will undoubtedly give the dairy interests a much larger market and increased profits. Already a London firm has contracted for the entire daily output of the Iowa Agricultural College, one of the places from which the experimental shipment was taken, and other large orders are confidently expected. The manufacturers, as a rule, have hitherto shown little judgment in their foreign shipments. They send abroad precisely the same goods that they made for their home sales, without regard to the fact that the tastes and notions of people are peculiar and differ materially in various parts of the world. Such a policy could never secure a foreign market for American goods however much fostered by home legislation. But Secretary Wilson went about the matter in an intelligent way. He took pains to have the butter he sent to England of a grade and variety such as English people prefer. He had learned that the Danish and Dutch butter so much favored in England was largely taken from the milk of American cows imported by the dairymen of those countries, and he determined that there should be a market for American butter shipped direct. That his judgment was sound is shown by the cordial reception given the American article.

A scientific test of different butters has recently been made, the result of which shows that the American article compares well with the foreign. Samples of English, Irish, Australian, French, Danish, Minnesota and Massachusetts butter were compared. On a scale of 100 points the Minnesota butter ranked highest at 96½; the Danish was second at 95, and the Massachusetts, although it was a little old and had lost flavor, stood third at 94. The importance of the test to American makers can readily be appreciated from the remark of an English buyer present who said he would be glad to take an almost unlimited quantity of butter equal to the Minnesota product at one cent a pound above the highest market quotations.

Secretary Wilson hopes to find a market for cheese as well as butter. One product can be produced as excellent as the other, and if the exports of this country have not been as large as they should be, the fault does not lie in the richness of the article, but has been merely because the American continued to send cheese to England of a kind liked here but which did not appeal to the taste of the English consumers.

Twenty years ago the United States furnished nearly half of the cheese imported by England, but there has been a falling off since then although the latter country consumes about twice as much as formerly.

As the result of Mr. Wilson's labors and practical lessons to the American farmer and dairyman there appears every reason to hope for a revolution of things that will bring to our manufacturers a goodly share of the coveted trade. The Secretary of Agriculture seems to be a man of sound practical sense, and the agricultural interests should be greatly pleased by his efforts in their behalf.

The lesson of adapting products to the purchaser rather than the seller is one that our people will not be slow to learn and to profit by now that their eyes have once been opened.

### Phosphate for Japan.

THE Farmers' Mining Company of South Carolina has made another big shipment of phosphate rock from Coosaw River to Japan. The German bark *Amazone*, with 1,900 tons of rock, sailed from Beaufort recently for Yokohama and is expected to make the trip in four months. This month a Charleston company will ship upwards of 3,300 tons of rock to the same people upon the sailing vessel *St. Mungo*.

The first shipment of Coosaw rock to Japan was made in 1888. Jokichi Takamine, a Japanese prince, came to this country, and while in New Orleans attending the Centennial his attention was attracted to the very fine quality of the rock. Takamine was a chemist of considerable repute, having graduated in that branch in Glasgow and Edinburgh. It was natural, therefore, that he should have noticed the superior quality of the Coosaw rock, and he was aware of the fact that fertilizers made from it would be just what the people needed at home. Later he came to Charleston and spent some time with Major Edward Willis. The prince took the keenest interest in the phosphate industry around Charleston, and in March, 1888, the first cargo of the rock was sent on its way to the far East.

A Charleston establishment about this time prepared for shipment a complete outfit of machinery for a fertilizer factory. This went to Yokohama along with the rock, and soon the plant in that country was ready to begin work. The Lizzie C. Troop, a sailing vessel, cleared from Beaufort in May of the same year with 1,894 tons of Coosaw rock. The Beele, of Oregon, had previously sailed (the first shipment) with a 1,595-ton cargo.

After 1888 the shipments of phosphate stuff to Japan were rather irregular. Rock from Algiers was sent to Japan and the company in Yokohama, equipped with Charleston-made machinery, continued to mine and supplied the Japanese with fertilizers. In 1894 the Farmers' Mining Company sent another cargo to Japan of about 1,100 tons. This was followed the next year by a cargo of 1,000 tons, and now the largest shipment of all has been started on its journey.

—The steamer *Condor* sailed from New York on the 20th ult. bound for Peruvian ports. With her general cargo she carried a complete electric light plant for the town of Arequipa.

### American Dairy Products.

THE keen interest of English traders in American dairy products is shown by the advent last June in the United States of Mr. W. A. McKnight, of Liverpool. Mr. McKnight was warmly received at Washington by Secretary of Agriculture Wilson, Secretary of the Treasury Gage and by President McKinley. All of these gentlemen took special pains to express their appreciation of Mr. McKnight's visit and to assure him that no reasonable effort would be spared to make his mission in the interest of our international dairy trade a success.

Mr. McKnight had a few complaints to make in regard to certain shipments of butter and cheese which he claims reached the English market in a shape far from that represented.

As these shipments caused widespread comment at the time in the English press, it might be well to remind British patrons that they should not labor under the false impression that imitation dairy products are the result of artifice on the part of the American farmer or dairyman. That there has been cause for serious complaint is no doubt true, but the fault should rest upon those to whom it properly belongs. The American farmer and dairyman is entirely innocent. A few unscrupulous dealers have done the mischief, and these parties once located no further trouble will ensue.

Foreign buyers, too, have the assurance of the United States Government that the facts laid before them by Mr. McKnight will be thoroughly investigated and stringent measures taken not only to effectually prevent the export of imitation or adulterated dairy produce, but to punish the offenders. The honor of the United States is at stake, and our friends may rest assured that there will be no further cause of complaint.

While we must deplore some of the circumstances of his visit, it is at least gratifying to know that the mission of Mr. McKnight was not altogether one of complaint. He had much to say in our favor, and we are indebted for his visit to the fact that the English dairyman takes so much interest in us that rather than weaken our relations even by a partial withdrawal of his support he calls us gently to account.

### English Opinion of American Farm Implements.

THE representative of Thomas McKenzie & Sons (limited), of Liverpool, England, and Dublin, Ireland, in the person of Mr. W. M. Cope, paid an extensive visit to Western manufacturing towns recently in the interest of his house. McKenzie & Sons are very large dealers in American farm implements, and the object of Mr. Cope's trip was to secure a stock of the latest and most approved designs. Speaking of the trade situation respecting this class of goods, Mr. Cope says: "We have been profitably handling American-made goods for a number of years and find that each consecutive season but increases their popularity. The English are peculiar in their acceptance of American goods, through an all-conquering prejudice against anything that represents Yankee ingenuity. In point of excellence in farm implements American manufacturers are vastly superior to the best English workers. All machinery of American make is lighter, more easily handled and easy of action; is equally strong and gives far better satisfaction, while far cheaper. In manufacturing these lines Americans are far and away in the lead, a situation that permits them to place almost all lines of farm machinery, with the possible exception of mowing machines, on the English market 25 per cent. cheaper than can the most skillful and successful British machinery makers. As all these goods enter England free of duty we can realize more handsomely on the foreign article than upon that made at home. The natural consequence of this is that English manufacturers are striving with might and main to equal in facilities and execution their progressive American competitors, an accomplishment they will yet be some years in consummating, however. The great trouble with the English goods is that they are all made too heavy; the fine judgment of the Americans in the proportioning of size and strength in construction not yet having been fully comprehended by the average English machinist. In the single instance of mowing machines only have the English attained any degree of perfection.

"The consumption of American goods is on the constant and rapid increase, the prejudice of the English giving way first at the difference in price, and finally from the sensible realization that they are the best on the market at any price. So when we once succeed in placing a consignment of American goods we feel reasonably certain of that trade in the future. There has been a wonderful increase in the importation of American goods the past few years, and this season will probably surpass all former records."

### Exports of Buckwheat.

THE Bureau of Statistics of the Treasury Department has decided that the exportation of American buckwheat during the last fiscal year has attained sufficient importance to be made a special matter of note.

Heretofore this article has been included in "all other breadstuffs, and preparations of, used as food," which is used to cover the exportation of breadstuffs not sufficiently important to be specially enumerated. During the last year there were exported 1,677,102 bushels of buckwheat. The Netherlands furnish the greatest market, 1,006,064 bushels of this total having been sent to that country; 425,244 bushels were exported to Germany and 154,557 bushels to Belgium. Denmark, France, England and British Africa receive the balance in small quantities. The value of the year's exports of buckwheat was \$678,959.



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REDUCTION MILL.  
MACHINERY, ROLLS,  
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Belt, Steam, Hand Power and Electrical  
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All Sizes of  
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The Monitor Coffee Separator and Grader

Will make clean separations and grade in one operation.

The Monitor Coffee Milling Machine,

The most perfect miller for coffee ever offered. It will do the finest work on tender as well as hard coffees, and do it without waste or breakage.

These Machines are in successful operation in many of the largest Coffee Houses in this country, and are well worthy of investigation by Handlers of Coffees.

Can be bought direct from manufacturers or through any reliable exporter.

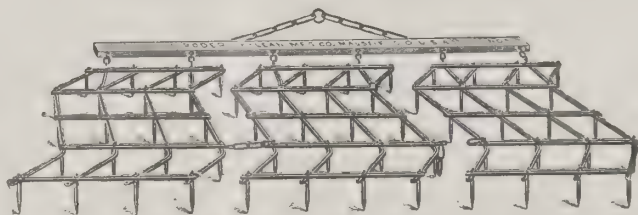
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Have been in the Market over 25 years and EXCEL ALL OTHERS.

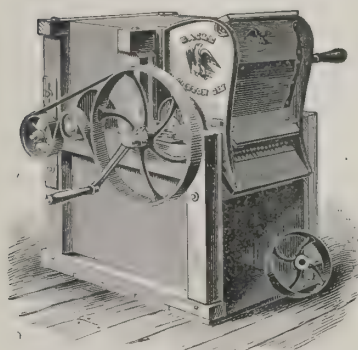
A large variety of Styles, Sizes and Weights suited to the Requirements of any Country. Manner of Packing secures Lowest Rates for Transportation to all Parts of the World. Write for full Descriptive Matter and Lowest Prices. In ordering through Commission Houses send Duplicate Order to us.



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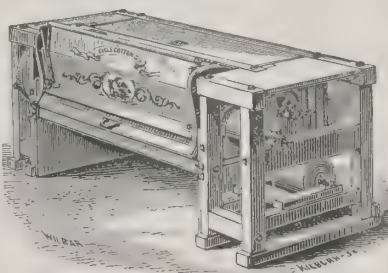
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## EAGLE COTTON GINS.

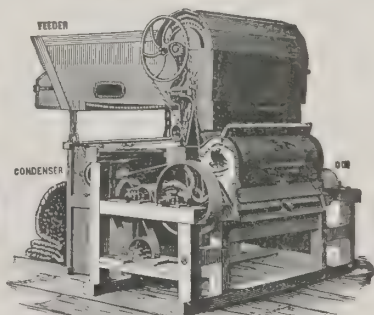


These Gins enjoy a BETTER REPUTATION THAN ANY OTHERS OF THEIR CLASS IN EXISTENCE, and are PREFERRED to all others made, on account of their STRENGTH, SIMPLICITY, DURABILITY, the amount and EXCELLENCE of the work they accomplish, and the RAPIDITY of their operation.

For further details, illustrated Catalogues will be furnished on application.



Power Gin with 12-inch Saws.



Power Gin with 10-inch Saws, with Feeder and Condenser.

Eagle Cotton Gin Co. { FORMERLY Bates, Hyde & Co. } Bridgewater, Mass.

Is SUPERIOR to "CORN STARCH," "ARROWROOT," "SAGO," Etc.

TRADE MARK  
**MAIZENA**  
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This is a brand for a preparation from the choicest parts of Indian Corn, or Maize, making a healthy and nutritious article of food, and a most

**DELICIOUS TABLE LUXURY.**

ITS PURITY AND DELICACY ADAPT IT TO BEING USED IN A GREAT VARIETY OF EXQUISITE DISHES.

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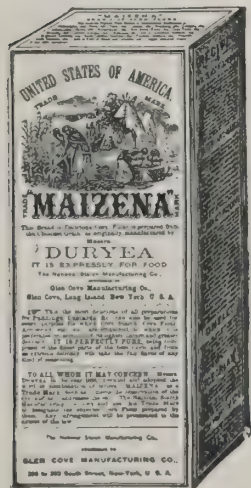
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Put up exclusively by THE NATIONAL STARCH M'F'G CO., successor to (Messrs. DURYEA) GLEN COVE MANUFACTURING CO., N. Y. U. S. A., in 40 and 20-pound boxes, in packages of 1 lb. and ½ lb., and may be obtained through all importing houses of South and Central America, and the West Indies, and all export houses of the United States and Canada.

None GENUINE without "DURYEA" appearing on the face of Package.



## ELECTRICAL NEWS.

## Giant Electric Light.

THE town of Massena, on the St. Lawrence River, is to have the largest electrical and hydraulic power plant in the world. The plans are already perfected down to the minutest detail, and construction will soon begin. Massena will be raised from obscurity to probably one of the most important manufacturing centres of the world.

Last January public attention was drawn to the enterprise by the announcement that the banking firm of Stewart & Co., of New York, and owners of the St. Lawrence Power Company, of Massena, N. Y., had negotiated bonds in London to the value of \$3,000,000. The enterprise, therefore, will be an Anglo-American affair and will be watched with the keenest interest from both sides of the Atlantic.

The company, organized under the laws of the State of New York, has a capital of \$6,000,000, and the people interested here and in England are of such a standing that it would be contrary to all precedent to predict anything but success for the venture. Such men never fail.

The engineering work is under the direction of the celebrated New York engineer, Mr. John Bogart, with Messrs. Kincaid, Waller & Manville, of London, as consulting engineers. The reports of the engineers show that work is progressing rapidly upon the great plant. A contract has been closed with a large and powerful construction company of South Bethlehem, Pa., who will undertake the excavating of the canal, the building of the power house and the construction of the intake and outlet flumes. The tremendous generators and turbines are to be of 5,000 horse-power each, the largest ever built, and will be furnished, the former by a celebrated electric and manufacturing company of Pittsburg, Pa., and the latter by a well known concern of Dayton, O.

The company is assured of success from the start, for the major portion of the power that it will be able to supply has already been contracted for by a syndicate, which proposes to use it principally for electro-chemical manufacturing purposes. Notwithstanding that the great strides made by Nicola Tesla in the development of economical transmission render it quite practicable for the company to send its power to other manufacturing centres than Massena, yet the indications are that the local demand will require even all the product of this gigantic plant. Besides, the place is an ideal one for manufacturing purposes. The New York Central and the Grand Trunk railways, which meet at Massena, offer exceptional transportation facilities, and the Vermont Central is but six miles away.

There is hardly in America an engineer who is better known in connection with great enterprises than John Bogart. Speaking of the plans of the St. Lawrence Power Company for the development of water power at Massena, he says in an official report:

"Unique physical conditions have made possible a great development of power at Massena, with comparatively moderate outlay. The St. Lawrence River carries the enormous volume of water gathered from all the great American lakes, and has at Long Sault Rapids a fall of over 50 feet. Southerly from the shore of the St. Lawrence above these rapids extends a comparatively level plateau of about three miles, where it meets the valley of the Grass River. A canal carrying the waters of the St. Lawrence from a point above the rapids to the valley of the Grass River will deliver that water upon turbine wheels with a head of over 40 feet. This water, after actuating the turbines, will flow through the valley of the Grass River and reënter the St. Lawrence below the rapids. The St. Lawrence Power Company has determined to construct a canal across this plateau to develop 150,000 horse-power, and to at once build at the Grass River a power house, and to furnish it with turbines and electrical generators sufficient to develop, before the close of the year 1898, electricity to the extent of 75,000 horse-power. The size of the canal, for which contracts have been made and work upon which is in progress, will be 225 feet wide and 25 feet deep. The line is nearly straight from the one river to the other. The turbines to transform into moving power the weight of the column of water will be upon horizontal shafts. There will be two twin turbines upon each shaft, it requiring four turbines to produce the power and speed required. These turbines will develop upon each shaft 5,300 horse-power. The horizontal shaft of the turbine is extended into the power house, and becomes the shaft of the revolving parts of the great electric generators. There will be in the portion of the power house now to be built fifteen of these systems or units of power, each of 5,000 horse-power capacity, thus developing in the power house 75,000 electrical horse-power."

B. F. Warren, vice-president of the company that is building the electrical appliances, said, in reference to the order:

"The largest contract for electrical apparatus which has ever been placed at one time is that of the St. Lawrence Construction Company with our concern for fifteen dynamos of 5,000 horse-power each. These machines are of the same capacity as those at Niagara Falls, which are the largest machines that have ever been built. In fact, no other electrical machines exceed 2,500 horse-power in capacity. The machines for the St. Lawrence Construction Company are not only of large size, but they involve a new design and are in many ways different from other machines. Each of these great machines will weigh about 350,000 pounds, the weight of one piece being as great as 125,000 pounds. The machines will stand 22 feet high above the top of the foundations, and each machine will occupy a floor space of 22 feet by 18 feet. Current from these machines may be used for various purposes. It is suitable for lighting and for heating. It can be used for driving alternating current motors for running factories and machine shops. It can be used for electrical fusion, in which

intense heat is produced in great electrical furnaces, and can also be used for electrolytic work, in which a chemical action takes place. Electrical experts in this country and abroad are greatly interested in the construction of this great electrical plant and predict that it will more than realize the expectations of its owners.

## Trolley Service—80 Miles an Hour.

THE Pennsylvania Railroad Company is making elaborate tests along its seven miles of trolley system, on the Burlington branch of the road, which extends from the main line of the old Camden and Amboy Railroad in the city of Burlington to Mount Holly. The tests, which have been most severe, were conducted under the supervision of some thirty electrical experts and, from a scientific point of view at least, gave most astonishing and satisfactory results.

This branch of the Pennsylvania Railroad was supplied with electric motive power two years ago, and three large cars almost as heavy as the ordinary American passenger coach were put into service.

The venture, however, did not prove profitable. The fares were reduced, but the traffic did not warrant the expense of operating the road.

Recently, however, the railroad company decided upon the test for its own satisfaction. They began on Monday, July 26th, and according to the officials the train attained the remarkable speed of 80 miles an hour.

Some idea of the power required to give this result may be judged when it is known that attached to car No. 2 were three heavy passenger coaches of the steam service and the dynamometer car. Notwithstanding such a handicap, the average time for seven miles was only 11 minutes, and included one stop. The grade is about equally divided between acclivity and declivity, and during the run the train attained the phenomenal speed recorded.

The only serious drawback to the entire success of the tests was the difficulty to keep the trolley on the wire. Each car has two, and when a high rate of speed is developed it requires but little force to throw them off.

Two of them were broken by becoming dislodged and striking against the cross wires. To overcome misadventures of this kind, however, should only be a matter of detail.

## Dynamo Run by Water Jet.

A VERY useful little invention has recently been placed upon the market here in the shape of a combined water motor and a tiny dynamo for general experimental work and for charging storage batteries, etc. The attractive feature about the little apparatus is that the quantity of water required to run it is so small that there is usually no charge for it. By its means, therefore, electric currents can be obtained at a very trifling cost.

It will be most useful in the charging of storage batteries for bicycle lamps, many thousands of which are now in use. Physicians, too, will find the little machine well adapted to charging storage batteries for cautery and other medical purposes.

A piece of rubber hose connects the motor to any ordinary hydrant or faucet, and the waste water falling from the bottom of the wheel case into the basin or sink is carried off by the waste pipe. As higher water pressure is obtained on the lowest floors of all buildings it is always best to connect as near to the entrance of the pipe into the building as possible.

The dynamo generates eight to ten volts and one to two amperes, according to the water pressure. The higher the pressure the greater the output. It will light a six or eight candle power 10 volt incandescent lamp, or several smaller ones, if connected in series.

The machines are furnished with series or shunt winding. With the latter type and with 40 pounds water pressure two storage cells in series may be charged. With 90 to 100 pounds three cells may be charged. Bicycle lamps are usually operated by two cells.

## Electro-Chemistry at Niagara Falls.

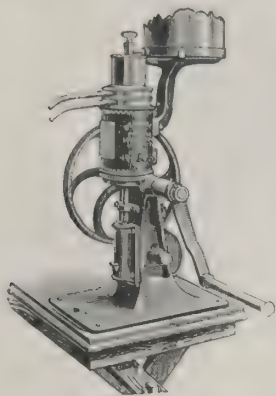
AN interesting development in the electro-chemical line, much of which has been little written about, is now going on at Niagara Falls. Electro-chemistry, or properly electrolysis, was, until recently, a comparatively little understood science. The greatest development has been made in Germany and France, and to-day large plants are profitably operated in those countries making a number of chemicals entirely by electrolysis. As one of the main expenses in electrical processes is the power, those plants which generate their electricity from a waterfall have proved financially the most successful, and the Niagara Falls region, with its vast supply of cheap power, has, therefore, more recently attracted the attention of enterprise and capital in this branch of manufacture. To-day the city of Niagara Falls has more factories making chemicals by electricity than any other city in the world. One of the several interesting new works of this kind, located there, is that of manufacturing chlorate of potash by a process patented by Henry Blumenberg. The uses of this product are constantly increasing. A large amount is used in calico dyeing as an oxidizer. It is also used in making parlor matches, blasting powder and some of the smokeless powders. Medicinally it is taken, in the shape of pellets, for various ailments.

The company's plant is the first one to manufacture chlorate of potash in the United States, and, as it thus marks the advent of a new industry there, it is not without special interest.—*Cassier's Magazine*.

--A steam tug costing \$35,000 has just been shipped to Colombia, South America.



# De Laval Cream Separators



Immediate and absolutely complete separation of cream from milk by machinery.

100,000 machines in use in every country in the world.

A saving of 10 to 20 per cent. in any climate, and 25 to 100 per cent. in warm countries.

Perfect separation and greatly improved quality of products.

Machines simple, durable and easily operated.

SATISFACTION GUARANTEED.

—PRICES, \$50 to \$225.—

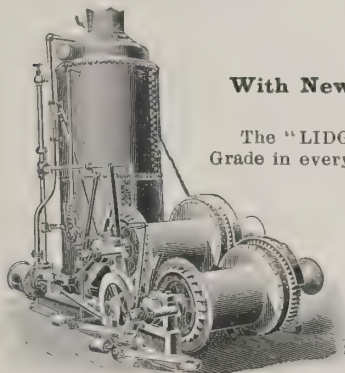
Hand or Power. Any Capacity.

Address for catalogue or any desired particulars,

**THE DE LAVAL SEPARATOR CO.**

General Offices, 74 Cortlandt Street. New York.

# LIDGERWOOD HOISTING ENGINES



With New Improved Patent Friction Drum.

The "LIDGERWOOD" Hoisting Engines are strictly High Grade in every particular and accepted as the STANDARD Modern High Speed Hoisting Engines, both as regards High Duty and Economy, Durability and Simplicity, combined with Ease and Rapidity of Operation.

FOR PILE DRIVING, BRIDGE AND DOCK BUILDING, MINING, RAIL ROAD AND CONTRACTORS' USE.

300 Styles and Sizes. Over 12,000 in Use.

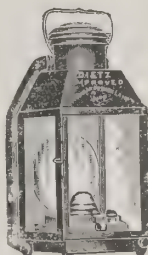
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**LIDGERWOOD MFG. CO.**

Warerooms: 96 Liberty Street, NEW YORK, U. S. A.

# Dietz Tubular Square Lamp

Is most desirable for sheds and porches, also for barns, stables, outbuildings, etc., where "no smoking" is desired. This is an extra fine Lamp, made in three sizes, has no chimney, and no complication to make trouble of any sort. It has an improved burner and outside wick regulator; gives a very brilliant light that the strongest wind cannot quench—and, in general, it gives universal satisfaction. The list prices of the three sizes of this lamp are \$5.50, \$6.50 and \$8.50, and the export discount 40, 10 & 5 per cent.

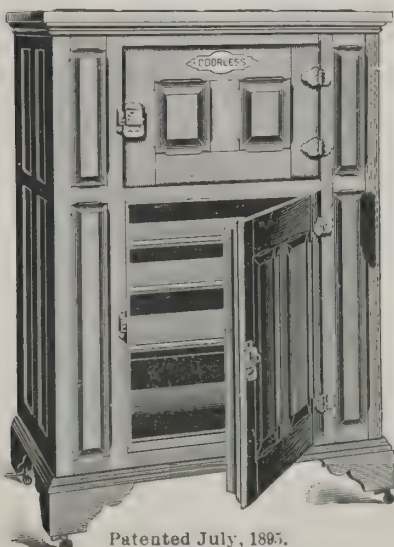


The Catalogue, which we gladly mail upon request, will give you an idea of the extent of our line of Lamps and Lanterns with prices and discounts.

**R. E. DIETZ COMPANY**

60 Lighthouse Street, New York, U. S. A.

Established in 1840.



Read's "Odorless" Refrigerator

A Scientific Preserver of Food

The air circulation is so perfect that One Dish Won't Taste of Another.

A GREAT ICE-SAVER.

NEEDS NO WASHING OUT.

It is endorsed by the most famous cooks in America, and in use in the best households.

Correspondence solicited.

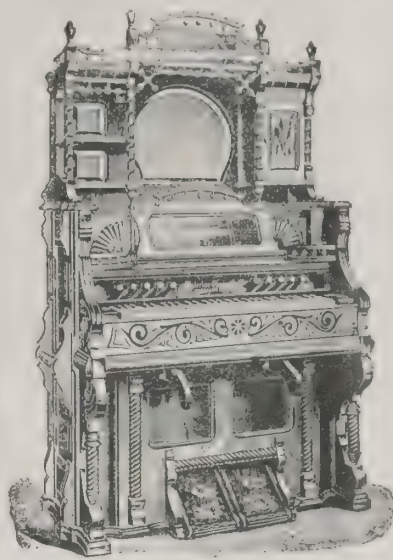
Shipments direct to importers or through export commission houses

Send for illustrated catalogue, FREE.

**The Keyser Manufacturing Co.**

CHATTANOOGA, TENN.  
U. S. A.

Patented July, 1885.



Waterloo Organs.

ESTABLISHED 1861.

**Fine Cabinet and Parlor Organs**

Especially adapted for Export Trade.

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OVER 25 STYLES.  
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Write for Catalogue and Prices. Address

**WATERLOO ORGAN CO.**

Waterloo, N. Y., U. S. A.

A TRADE BRINGER.

THE **DE LONG HOOK AND EYE.**

WHY?

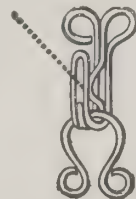
Well, when women use it once, they use it again.

Absolutely it will not unhook unless you unhook it yourself.

It's genuine if on the face and back of every card of the famous De Long Hooks and Eyes you find the words:

See that

**hump?**



**RICHARDSON & DE LONG BROS.,**

Philadelphia, Pa., U. S. A.

**Jas. Walmsley & Sons.**  
Established over 50 years

**Curriers and LEATHER Merchants**

**MAKERS OF ALL KINDS OF SINGLE & DOUBLE BELTING.**

Abbey & Peel Park LEATHER WORKS.

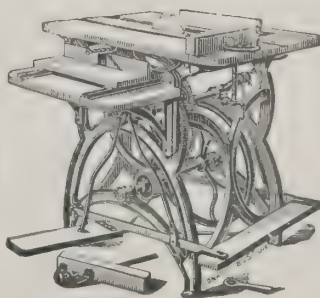
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**Specialties**  
DOUBLE BELTINGS ON IMPROVED PRINCIPLE  
ROLLER SKINS.  
GREEN & OAK TANNED  
PICKING BANDS.  
TUGGERS, LEATHER PICKERS.  
LACES, BUFFALO SKIPS.  
PICKERS, BUFFERS, &c.

# MARSTON'S FOOT AND HAND POWER SAW

FOR RIPPING, CUTTING OFF, GROOVING, RABBETING, CUTTING TENONS, MITERING OR BORING.



Weights 300 pounds. Gauges slide in planed iron grooves in top. Gears are all machine cut. Shaft and arbor are made of steel.

Price, - \$60.00.

With boring table and side treadle, \$67.00.

**JOHN M. MARSTON & CO., Boston, Mass., U. S. A.**



# Anything Supremely Good

of its kind is

## Bound to Go.

(This is a Safe Prediction.)



# "MONARCH" ....AND.... "DEFIANCE"

BICYCLES ARE  
**SUPREMELY GOOD.**

## MONARCH CYCLE MFG. CO.

Lake, Halsted & Fulton Sts., Chicago, Ill., U. S. A.

MENTION THIS PAPER WHEN WRITING.

## THE BLACK MFG. CO., - ERIE, PA., U. S. A.

We build bicycles of the finest quality only and have nothing to offer either in cheap or medium grade wheels. Our discount for export is 30 per cent., and we deliver machines properly boxed f. o. b. New York. Order through your commission house and send copy of order direct to us.



**TRIBUNE MODEL 27.**

Price \$100. Weight 23½ lbs.

This is our standard men's wheel and is suitable for all kinds of road use. It is built in three heights of frames, 22½, 24 or 26½. The wheels are 28 inches diameter; 28 inches will be furnished if preferred. Gear, 68; options, 60, 63, 72, 73 or 80; cranks, 6½ inches, 7 inches if preferred. If not otherwise specified, all machines will be fitted with Hartford or Morgan & Wright tires. All wheels are supplied with tool bag, tools and repair kit. Regular finish, black enamel, nickel trimmings. If a lighter wheel than the above is desired, order should specify Model 21, which will weigh with light road equipment about 20½ lbs.

## Tribune Bicycles.



**TRIBUNE MODEL 24. Price \$100.**

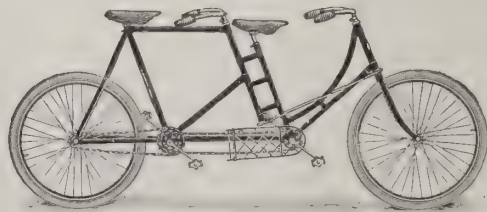
Our ladies' wheels are built in three heights of frames, 20½, 22½ or 24 inches. 20½ inches is standard and will be shipped if not otherwise specified. Wheels, 28 inches, can be furnished, with 26 if preferred. Regular gear, 68; options, 56, 60, 63 or 72; cranks, 6 inches throw. The weight is about 24 lbs.

The Celebrated  
Cycloidal  
Sprocket.



Used on

Tribune  
Bicycles only

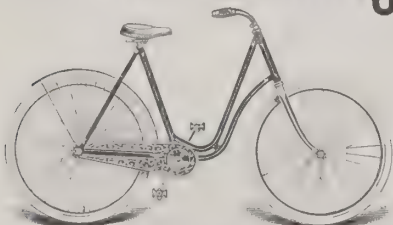


**TRIBUNE MODEL 23.**

Price \$150. Weight 44 lbs.

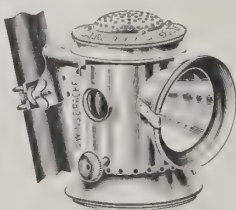
Our tandems are also built with double diamond frame for use of men riders. Wheels are 28 inches; height of frame, 24 inches; ladies' forward frame, 20½ inches. Gear, 68; can fit with 72, 76 or 80, if desired.

## For the Leading American Wheel Order the "GREAT EASTERN."



It is up to date,  
very handsome and  
attractive,  
beautifully finished  
and a great seller.

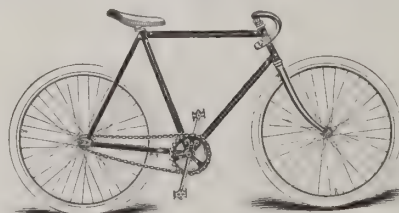
SEND FOR 1897 CATALOGUE "B."



ALSO ORDER THE

"ATWOOD LANTERN."

It is a perfect burning light; it will not jar out; it has a swing bracket, and will always stand perpendicular no matter where you lean the wheel.



## EASTERN CYCLE MFG. CO., Amesbury, Mass., U. S. A.





THIS DEPARTMENT IS DEVOTED  
TO THE FOREIGN TRADE IN  
CYCLES AND SUPPLIES.

### American Wheels.

THE American bicycle is causing quite a little commotion abroad both in England and in Germany, and American manufacturers are coming in for a fair share of mingled praise and abuse. That they merit the former is obvious from the fact that it comes unsolicited from friendly but competitive sources and as an outburst of honest criticism, when it might have been more to the foreigner's interest at least to have said nothing at all. As for the abuse, or let us rather say harsh criticism, it would at first glance seem to be about equally merited. Certainly the American element in many cases is largely deserving of the many detractory remarks concerning the American wheel, remarks that keep so constantly appearing in the British and German press.

The American is accused of flooding the English market with a low-grade article that has not stood the test of comparison with the homemade wheel and which, from the murmurs of the press, has caused much dissatisfaction and discontent among purchasers. The American wheel has been set down as flimsy of construction. It is said that it fails to stand an ordinary test of wear and tear. Then, again, with this liability to break down at any time, the complaint is made that repair parts cannot be obtained. And so the British public is cautioned against the American wheel.

Now, the people of England are noted for their methodical ways, their clear common sense and their fair and good judgment. They should surely understand, then, that it is no more possible to obtain a high-grade wheel at a low-grade price than it would be to purchase sovereigns at nineteen shillings each. They sought for and obtained a cheap class of goods. The American manufacturer in this country caters to all classes. He makes wheels both cheap and good. He has to; but it was poor judgment on his part to place in the hands of English dealers an article that regardless of price could by any chance invite a criticism likely to reflect upon his reputation. However, he but *sold*; the English dealer *bought*. Which is the more to blame?

The situation is clearly set forth in a letter to THE AMERICAN EXPORTER of August 2d from a large Buffalo manufacturing house. It reads in part: "We regard the bicycle trade in a much healthier state than for the past two years and that the importers will have less poor and cheap material dumped upon them in 1898 than has been done in the past year. The exporters and foreign buyers have made the mistake of buying anything they could get for the least money; if they will confine themselves to deal only with reliable people that have the reputation for good articles they will get the worth of their money and have no cause to regret their investment."

This expression of opinion from a leader in the American trade is the key-stone of the whole situation, and is amply substantiated by the unstinted praise that has come from quarters of the United Kingdom where price has not been the primary consideration.

In Germany the situation is different. There the American bicycle does not appear to have appealed to the people on the score of cost. In this respect it is distanced by the home article, but its intrinsic worth seems to have cast such a shadow upon a cost that exceeds the domestic article by about 75 per cent. that the problem there is how to make the American bicycle cost so much that the German cannot afford to ride it. This from one of the most skillful nations of the manufacturing world is a compliment that the United States makers cannot well afford to allow to pass unnoticed. Applying it to England it is a complete vindication of any charge brought against the American manufacturer that he does not produce wares to equal the standard demanded by the most particular and critical people of the world.

The press reports from Germany indicate that there has been a very strong movement upon the part of the home manufacturer to induce the Government to help him out of the situation, but the same source of information intimates that he has been refused the protection asked for. He must, therefore, compete with us upon a level ground. It is hard to refrain from the remark that this is a very farsseeing policy on the part of the German administration.

There is nothing like forcing a man to a corner to bring out his fighting capabilities, and we have so much respect for the latent powers of our rival that

we would advise our home manufacturers to keep an open eye on German makers; they may lead us a lively dance before very long.

The restrictions placed upon the bicycle in Russia do not seem to have had a very material effect upon the trade in that country, where the American seems to be doing more than holding his own. The distinctions between wealth and poverty are so well defined in Russia, and the middle class is so small in proportion to the enormous population, that it is a matter of some surprise that the wheel has found the favor already accorded. To ride a wheel in St. Petersburg one must first obtain a permit and pay a license fee. The official license must be carried about at all times and have attached to it a photograph of the party obtaining it. It would, therefore, be a dangerous practice to loan a wheel to a friend (a hardship perhaps not altogether unmixed). An official number must also be placarded fore and aft of the machine. The regulations require a most rigorous observance of the right of way accorded to all other vehicles and to pedestrians. The bell must be used with prodigality, the curb must be followed as closely as possible and certain crowded thoroughfares are tabooed entirely. Ladies, too, have only recently been accorded the privilege of the bicycle.

In Russia the Russian bicycle retails in St. Petersburg for from \$42 to \$67. The German wheel brings from \$77 to \$92.50, the English from \$82 to \$128.50 and the American from \$103 to \$128.50. Up to the present only high-grade American wheels have been offered for sale and it cannot be denied that preference is accorded them on account of finish, lightness, running qualities and general durability. Notwithstanding this, the difference in price between them and the Russian and German wheels is too great. The total number of bicycles imported in Russia in 1896 was 10,609, and the duty on each wheel, whether for child, adult or tandem, is \$9 26.

As for American accessories—well, we cannot do better than quote from an esteemed contemporary in England, who says: "American accessories continue to flood the market. In almost every cyclists' provider's establishment, from Gamage's down to the very humblest retailers, we find Yankee notions prevailing. Saddles, cyclometers, inflators, lamps, bells, oilcans, and other various necessities of cycling life, bear traces of transatlantic origin. We are led to wonder what our home accessory manufacturers are doing. In lowness of prices the Americans manage to score, and the articles they send over here look attractive enough. The cycle accessory trade in England is a very important branch of industry, but it would appear that it is likely to suffer severely from competition."

### New Bicycle Gear.

TO overcome the disadvantages of the bicycle chain which, clogging with oil and dirt, requires frequent and tedious cleaning, many inventors have striven to find a practicable and efficient substitute. But the fact that the chain remains in universal use shows that they have not succeeded.

Mr. L. H. Wattles, of Providence, R. I., is among the many who still believe the chain and sprocket driving gear can be improved upon.

Recently he patented a driving mechanism with a flexible connection which, however, does not materially change the general appearance of the bicycle. Each sprocket wheel has a V shaped groove in which a belt made of rubber and silk runs. The working side of the belt has V shaped lugs. This is the novel feature of the improvement. The lug, being pyramidal or tapering in shape, it will be seen that in passing around the wheels the inward pressure on the lug will force it into the groove, compressing it laterally or transversely of the wheel, this compression being possible because of the freedom of the faces of the lug which are opposite to the preceding and succeeding lugs to correspondingly expand. Thus, a very large friction is obtained between the lugs and the wheel and slip or lost motion is entirely avoided.

The weight of the driving connection is less than sprocket-chain gearing or toothed wheel. It is practically noiseless. It is less expensive than other forms of driving mechanism employed on vehicles of this class. It will work even when the driving wheels are not in alignment. Another advantage is that it requires no oil or lubricating medium. Therefore, it remains practically clean at all times, since any dust collected may be readily brushed off.



### Some Improved Bicycle Attachments.

OF bicycle inventions there is apparently no end. This branch of industry has been productive of more inventions during the past few years, since the bicycle sprang into popular favor, than any other.

One would almost imagine that surely even the fertile brains of the inventors would give out, that they must at last come to the end of their tether, but the Patent Office records show no diminution in the number of patents granted. While the vast majority of them are freak ideas, impracticable or of no value, there are a few recently recorded that seem likely to prove of service.

An original application of an old scheme comes in the form of a burglar-alarm attachment for wheels which makes one's mind easy that no one is meddling with the wheel when left on the sidewalk for a minute. It consists of a bell fixed inside of a casing attached to a fixed part of the wheel. The bell is operated by a trip bar extending through the casing, so that if the wheel be moved when the trigger is set the bell begins to ring vigorously. This trigger can be set by a key or by a concealed spring.

Another meritorious protective device is the coin-in-the-slot rack. One places one's wheel in this rack and it is automatically locked there. When it is to be released a coin is dropped in a slot, which releases the key controlling that particular lock. Then when the wheel is free the key is engaged in such a manner that it cannot be taken out again until the same operations are repeated. A device of this kind should prove valuable in buildings and at parks and pleasure grounds, as it provides absolute safety without the necessity of an attendant.

Foot brakes are becoming popular with men. The latest designed acts by a friction roller journaled between two levers at their forward ends. A spring holds this out of contact with the wheel and foot levers are placed on each side, so that either foot can be used.

In the matter of handle bars, the adjustable one has, for a time at least, been relegated to the past and attention has turned to the grips. Pneumatic grips are new, and it is asserted have special advantages. Handle bars, too, have come out with four grips—that is, two at the extremities as usual and one on each side of the centre, just where the average man is apt to place his hands for easy riding.

The advent of the chainless wheel has caused attempts to be made to make the ordinary design look like one by concealing the chain gear in a case. A goodly number of patents have been recently granted for gear cases. Usually both the sprocket wheels and chains are inclosed.

The gear cases certainly have the advantage of prolonging the life of the chain. They cause it to run easier, as the oil is not so prone to evaporate or to become clogged with grit and dust.

One of the very latest inventions comes in the shape of a new design for a sociable bicycle. Its construction is the same as usual except that it is provided with two saddles set apart on a cross bar from the main post. The handle bar is straight and long enough for two and the crank shafts are doubled; that is, each comprises a short arm and a pedal and a long arm and a pedal at its extremity. These arms are so designed that the pedals come directly under the respective saddles. We have not seen the machine working, but from the design it appears feasible.

### A Puncture-Proof Bicycle Tire.

MR. FRANZ A. HAMP, of 210 East Pearl street, Cincinnati, O., has patented a bicycle tire which, while practically solid, is designed to have all the resiliency of an ordinary pneumatic tire, being at the same time puncture proof. In outward appearance the tire is the ordinary air-inflated rubber tube. The space usually occupied by the air, however, is filled with sections of cork fitted together to form a perfect ring around the rim within the rubber casing. These sections are held together by a wire passing through the centre, whose ends, meeting, are twisted together and carried in opposite directions. This is accomplished by means of a thumbscrew passing through the rim of the wheel to the centre of the tire, to which both ends of the wire are fastened. The ends of the rubber casing are preferably brought together at the point where the tire is secured, and here a rubber covered metal sleeve is tightly fitted round the tire, there being usually two of these sleeves, embracing the tire at opposite points in its circumference. It is not necessary that the outer section or rubber casing need have two ends, for all that is required to fill them with the cork core is an opening on the inner side. The tire is cemented upon the rim and the cork, first subjected to hydraulic pressure, is impregnated with a fluid to enable it to maintain its elasticity. The inventor has also designed machinery for preparing the cork, and claims, as the result of his invention, all the essential good qualities of the pneumatic tire, with neither the danger of puncture nor the inconvenience of constant inflation.

### An Open-Backed Hair Brush.

A VERY simple little novelty, but one of considerable interest and value, has just been patented by a New York concern. It is merely an ordinary hair brush but with an open back. Instead of the usual solid back this brush has the material cut away between the rows of bristles, so that all dust and dandruff fall through instead of lodging between them.

The samples shown are made of the best quality of bristle and the finish is very fine. From a sanitary point of view alone the new brush will appeal to the people, and it is likely to become a factor in the line of toilet goods.

—A large quantity of wood pulp for paper manufacture has been ordered for Germany.

### A Freight Bicycle.

STILL another innovation in the cycle world comes in the form of what is known as the Klondyke bicycle, especially adapted for carrying freight. It is the invention of a member of a party of New York men who are going into the gold business at the Klondyke upon an extensive scale. A syndicate has been formed for the purpose of buying up promising claims and special boats will be sent to Juneau with a general cargo of miners' supplies. Then the Klondyke bicycle comes into play. It will be used to transport the supplies over the 700 miles between Juneau and the gold fields by the Chilkoot Pass trail.

Every miner who goes to the gold fields must take with him about 1,000 pounds of supplies, and the only way to transport them is for him to carry them on his back. The most a man can carry for any distance is 200 pounds. The method now in vogue is to carry one load about five miles, hide it so that it will not be destroyed by animals, and then go back for another. In this tedious way the goods are finally transported to their destination.

The Klondyke bicycle is specially designed to carry freight, and is in reality a four-wheeled vehicle and a bicycle combined. It is built very strongly and weighs about 50 pounds. The tires are of solid rubber,  $1\frac{1}{2}$  inches in diameter. The frame is the ordinary diamond, of steel tubing, built, however, more for strength than appearance, and wound with raw hide, shrunk on, to enable the miners to handle it with comfort in low temperatures. From each side of the top bar two arms of steel project, each arm carrying a smaller wheel, about 14 inches in diameter, which, when not in use, can be folded up inside the diamond frame.

Devices for packing large quantities of material are attached to the handle bars and rear forks, and the machine, it is estimated, will carry 500 pounds.

The plan is to load it with half the miner's equipment, drag it on four wheels ten miles or so; then the rider will fold up the side wheels, ride it back as a bicycle and bring on the rest of the load. A sample machine has already been made and patents have been applied for.

### Automatic Finish Recorder.

INVENTORS have been trying hard for a long time to devise some contrivance that would successfully record the finish of a bicycle race. At last one has been produced by a Boston man which seems practicable and which will likely find favor at the various race meetings of American wheelmen.

The machine is operated by a series of wires laid under a rubber band  $\frac{1}{8}$  of an inch thick and 2 inches wide, which covers the finish or tape line. These wires are then carried to a recording table placed in the judges' stand and connected with a watch. The watch, which is under the table, is started at the firing of the pistol, and is stopped at the finish by the same electric connection that records the finish of the riders.

The first touch of the wheel on the rubber band registers each rider instantly as he finishes. A twentieth of a second can be distinguished on the recording dial. In this way dead heats would be rendered impossible and men placed in the proper position if the contrivance is a success.

### A Car for the President.

AN enterprising journal has originated a project to build a private car for the President of the United States from material and contrivances supplied for the purpose by the various car-building and affiliated industries throughout the country.

This private car, it is proposed, will excel everything that has yet been accomplished in the art of car building in America. It will represent the record of American ingenuity in the substantial character of its construction, in the completeness and convenience of its furnishings and in its rich and artistic decorations.

The main object of the contributors to this unique idea is to demonstrate to the world the surpassing excellence of this industry in the United States and to present to the nation a tribute from the car-building fraternity for the personal and official use of the present and successive Presidents.

The designs and specifications for the car are being prepared under the supervision of a committee of twenty five prominent and representative master car builders and superintendents of motive power for various railroads; so that the car when completed will be a sample of the utmost skill and ingenuity and experience of the American car builder. Already much of the material required for its construction has been tendered by leading dealers and manufacturers in the railroad supply trade and the projected movement offers an opportunity to others not actually engaged in the car business, but who have the means at command and who would be greatly pleased at the chance to contribute various supplies and materials for the furnishing and decorating of so elaborate a vehicle as a private car for the personal use of the President of the United States.

THE Bureau of Statistics at Washington has issued the following statistics showing exports for the month of June, as follows: Breadstuffs, \$12,017,221; decrease, as compared with June, 1896, of about \$80,000; cotton, \$4,814,370, decrease about \$397,000; mineral oils, \$5,655,793; increase about \$367,000; cattle and hogs, \$3,499,113; increase about \$134,000; provisions, \$12,166,962; increase \$1,143,000.

—Thirty-two iron safes are on their way to Shanghai, China, from Cincinnati.



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MADE BY SKILLED MECHANICS.

Constructed from the Best Material Obtainable.

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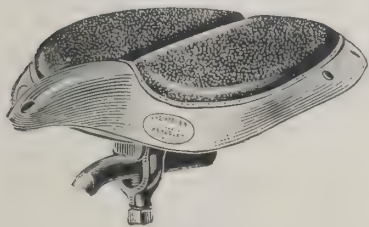


Two Models, Ladies' and Gents'.

Write for Catalogue.

THE NORTHAMPTON CYCLE COMPANY,  
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NO. 14 A.

For an easy and comfortable Saddle, this beats any Saddle on the market. Handsomely padded and covered with the finest leather in either black or russet.

Strictly Hygienic.

LIST PRICE, - \$4.00.

Send for catalogue and jobbers' prices. Send us duplicate order when ordering through commission merchants.

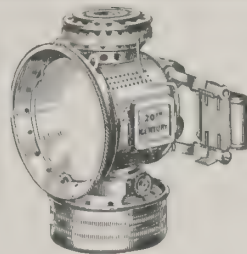
HARDEN SADDLE AND SPECIALTY CO., Toledo, Ohio, U. S. A.

for Bicycles.



List Price, \$3.00.

The bottom of this seat is made of light material; the sides and back are of rattan, beautifully woven and mounted on a double steel wire spring clamped rigidly to handle bar post, with a movable foot rest. The seat is covered with a nice cushion, making a very beautiful and easy riding seat for a child. See this seat and you will have no other.



Burns Kerosene. Keeps Lighted. Greatest Light on Wheels.

## 20th Century Bicycle Headlight and Driving Lamp.

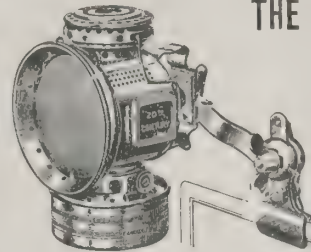
POPULAR ALL OVER THE WORLD.

BICYCLE HEADLIGHT, with detachable Bicycle Holder, removed by simple pressure from the Lamp as well as from the wheel.

PRICES IN THE U. S.

Including one attachment, either Bicycle or Dashboard, gossamer hood, etc.

STANDARD.		TANDEM.	
Nickel	\$3.00	Nickel	\$4.00
Japanned (black)	3.00	Japanned (black)	1.00
Aluminum	3.75	Aluminum	5.00



## THE TANDEM SIZE AS A DRIVING LAMP,

with detachable carriage attachment, can be placed at any angle on dashboard or side irons of any vehicle.

With the Bicycle and Carriage Holder detached and the ball handle raised the 20th Century makes a most excellent Hand Lamp for the house, barn, country road, camp, hunting and for boats. It may be used with colored front glass for developing photographs, etc. If not obtainable from dealers sent on receipt of price by



20th CENTURY MFG. CO., 17 Warren Street, NEW YORK, U. S. A.

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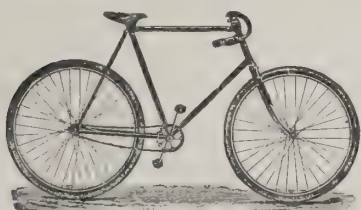
\$100



The Best Wheels in the World!

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Men's No. 7, 24 lbs., \$100.

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ORDERS ACCEPTED THROUGH RELIABLE COMMISSION HOUSES.

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Women's No. 6, 25 lbs., \$100.

Export Discount, 55 per cent.

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FRAMES—22, 24, 26 inches high; seamless steel tubing, large diameter; reinforced joints, 43 inch wheel base.

WHEELS—28 inches, wood or steel rims; piano-wire swaged tangent spokes nicked, barrel hubs turned from bar steel; M. & W. tires.

BEARINGS—Dust-proof; large balls; special steel cones, oil tempered; steel-ball races, tempered and polished.

HANDLE BARS—Drop, high, Ramshorn, steel or wood; cork grips.

GEAR—64, 68, 72, 76, 80; forged sprockets, hardened; Cranks, 6½ inch, forged; Chain, ¼ inch, hardened.

FINISH—Black or colored enamel, highly polished; nickeling done on copper

EQUIPMENT—Saddle, pedals, tool bag, tools and tire-repair outfit.

An extra set of Bearing Cones furnished with each Wheel for Export.



ENVOY.

None but expert mechanics employed in their construction.

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Best wheels ever offered at anything like the price.

Write for catalogue and full information as to terms, etc.

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Our Watches and Clocks are known throughout the world as of the highest quality, and our Cycles are of the same grade.

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Watches,

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### The Longest Tunnel in the World.

THE longest tunnel in the world is in process of excavation at Colorado. The main bore of it is to be twenty miles long, but shorter tunnels branching out from either side will increase the length to at least fifty miles. These immense burrowings are to be under those famous Colorado hills of which Pike's Peak is the greatest giant. The boring will begin at a point near Colorado City, not far from the foot of the mountain and close to the main line of the railroad. It will terminate at Four Mile Creek, about six miles south of the celebrated Cripple Creek gold region, and will pass under the core of the mountain at a depth of nearly 7,000 feet.

At present the shortest route from Colorado Springs to Cripple Creek is fifty four miles, but when the new tunnel is complete this distance will be reduced to less than twenty-five. The little towns of Victor, Gillette and other small villages, as well as nearly a thousand mines, will be made tributary by means of lateral tunnels.

A careful estimate places the average cost per foot of the excavation at \$80, or for the whole fifty miles a sum of over \$21,000,000. But all this sum the projectors hope to crush out of the ore brought to the surface in the excavations or from secret pockets of gold in its pathway. It is almost as much of a prospecting venture as of a commercial enterprise, for they look forward to the discovery of new mines of untold wealth during the progress of the work. At present the daily rate of progress averages twenty feet and seven years will be required to complete the work.

### American Pumice Stone.

WITH the growth of our manufacturing industries the use of pumice stone as an abrasive or polishing material has increased very rapidly. Until quite recently the supply has been obtained almost exclusively from Italian sources, but now an American product has not only cropped up but bids fair to command the trade. An excellent quality of pulverized pumice has been found in Western Nebraska, where some seven different deposits have been discovered, comprising in all about 400 acres with approximately 800,000 tons in sight, according to a report made Prof. R. D. Salisbury, of the University of Chicago.

The pumice stone found in these deposits has been pronounced practically pure, but of different degrees of fineness, ranging from an impalpable powder to a grade that would make a medium coarse glass paper. A Chicago company has acquired these deposits and has also purchased a considerable tract of land about them so as to control any new fields. The same company after great search also came upon a deposit of lump pumice in Utah, 245 miles south of Salt Lake City and near a branch of the Utah Central. This property comprises 120 acres and the company now claims that they have the only deposits of pumice known in the country. The Utah property is very rich. It is practically a mountain of lump pumice stone of all degrees of quality, but entirely free from intruding crystals or other hard substances.

The company has erected works in Chicago with a capacity to handle forty tons per day, furnishing a product of pumice in all the merchantable grades and forms.

### The American Mosquito.

VERY industrious, energetic party is the American mosquito. He has headquarters in New Jersey and branch houses throughout the whole land. He is a creature of indefatigable energy, and we are told that he is pushing his trade abroad. We are therefore prompted in the interest of mankind to publish the following letter which appeared in the New York *Sun* of August 9th last under the caption "Great News for Jersey":

"TO THE EDITOR OF THE SUN—Sir: A friend sent me the following advice, clipped from the correspondence column of a nearby newspaper: 'Mix one ounce of oil of sassafras with five ounces of alcohol. A few drops of this poured into the palm of the hand add rubbed over the exposed parts will prevent mosquito bites.'

"I am usually skeptical concerning recipes from the laity, but having recently been almost completely deprived of my evening piazza enjoyment by the multitude and voracity of these pests, I invested a quarter in a six ounce bottle of the mixture last week and gave it a trial. I was agreeably disappointed to find that it was thoroughly effectual. It did not keep the mosquitoes from alighting on me, but they would not have got away quicker had my cuticle been red hot, and since that time I have spent my evenings in solid enjoyment.

"One application will prove effective for from two to three hours; the mixture does not stain, the odor is not unpleasant and it can be procured in any village drug store at small cost.

MONTCLAIR."

—Belfast, Ireland, has recently patronized a sale of American horses with such enthusiasm as to give American horsemen great encouragement to look to Ireland as a good market for horses of American breeding.

—Oklahoma, from being a dreary waste, has suddenly become one of the garden spots of America. An authorized statement concerning it is that if other crops do as well this year in Oklahoma it is expected that its exports of wheat, cotton, live stock and miscellaneous crops will bring the people a total revenue of at least \$13,000,000. This is \$52 per capita, for every man, woman and child in the territory, and 75 per cent. of the money is clear for investment during the coming year.

### Branding American Goods.

AMERICAN manufacturers are awakening to the fact that to secure and retain their reputations a liberal use of branding work is necessary, and the practice is constantly increasing. A number of merchants and manufacturers agree in saying that to increase and retain foreign trade there is no better way than to give the article about to be introduced abroad a registered trademark, compelling the buyer here to purchase the goods called for.

This practice is being carried out by any number of manufacturers with very good results. There are to day axes, shovels, valves, tool steel and many other manufactured articles that are being shipped in preference to others, owing to the brand being thoroughly known abroad.

A certain axe manufacturer years ago built his export trade on his various brands. Though many attempts have been made to imitate his labels, and the shape of his goods, etc., by both home and foreign competitors, he still enjoys the reputation of being the heaviest exporter in his line, and, what is better yet, merchants abroad will take no substitute. Some tool steel manufacturer has recently labeled a certain quality of steel for the Mexican market at the request of an export house. Orders for this steel have been so satisfactory that, it is rumored in the market, other makers are beginning to adopt the same system. In the exports of dry goods the brand is the most important part, and, according to the opinion of leading exporters, the same custom is being adopted more and more every year with manufactured iron and steel goods.

### Stationery for Abroad.

VERY healthy state of affairs exists in American stationery and kindred lines for Europe and South America. The export trade is larger now than at any other previous season, though some of the leading wholesale houses are somewhat diffident in affirming that the demand is to be a steady and increasing one. It is learned from one of these houses, however, that the European trade is growing every year in certain classes of goods, and that owing to the novelty of the wares an ever-increasing demand is expected for the balance of the year. The stationery line covers such a variety of manufactured articles that it is not an easy task for a general export house to keep posted as to the manufacturers of the various articles. It is on account of this difficulty that most of the export stationery trade is controlled by the wholesale dealers. The average order for export will contain from thirty to forty items, the invoice value of which rarely reaches upward of \$5,000 or \$6,000. Particularly does this apply to exports to Mexico and to Central and South America. To Europe the variety of articles is much less, but the quantities being larger the bills reach a greater amount. A wholesale stationery merchant of New York claims to have been doing a constant trade with Australian markets during the past four years, and each year he reports the orders have been growing in amount. The same firm shows considerable enterprise in having just sent a traveller on an experimental tour through South Africa.

### A Famous Water Power.

THE power of the famous Falls of Foyer is being utilized in the generation of electricity for the manufacture of aluminum and of calcium carbide, from which acetylene gas is made. The fall has a height of 350 feet or double that of Niagara and over five times that of the cataract at Neuhausen on the Rhine. At present four dynamos driven by turbines are used for the aluminum process and one for the carbide, a vertical shaft connecting the water wheel and the armature. Each turbine is designed for 700 brake horse power, running at 140 revolutions per minute under a fall of 350 feet.

Apropos of the aluminum trade, an interesting announcement was made a few days ago that contracts had been signed for the shipment of 1,000 tons to the English market. This order was taken in open competition with all the aluminum works of Europe. The metal is sold to British metal dealers, who in turn resell it to the sole manufacturers of aluminum goods in Great Britain.

The total American output of aluminum for 1896 was about 1,300,000 pounds, and it is estimated that the production for 1897 will reach 2,000 tons, of which it is expected 1,000 tons will be consumed in the United States. The delivery of the English orders will cover a period of four years, which will leave a surplus of American aluminum for export to other countries.

### Silk in America.

THE silk industry here is just reaching that period of life when it is not only able to walk alone, but is ready to take its place among the sturdy competitors of other countries and to claim a fair share of foreign trade. There are in the United States upwards of 600 silk mills and over 75,000 hands are employed in the industry.

About one-third of these mills are devoted to the manufacture of fine ribbons, and at least one-quarter of the number are located at Paterson, New Jersey. The value of the annual outputs of these mills has reached \$80,000,000 and has been estimated as high as \$100,000,000. New looms are being constantly erected everywhere and the state of the silk trade to-day is reported from good authority as healthy and steadily progressive. Probably the finest silk machinery in the world is made in America and by means of it the Americans hope to overcome differences in the labor market.

It will not be long before American silks find their way into the European market.



# Hunt

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FOR THEIR SUPERIOR QUALITY, DURABILITY AND COMFORT.

European Agents: MARKT & CO., Ltd., Hamburg, London, Paris and New York.

Send for catalogue showing many different patterns.

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The felt pads are supported on a laced framework of tough but elastic leather thongs.

## IMPERIAL Bicycle Lanterns

ARE FAVORITES THE WORLD OVER.

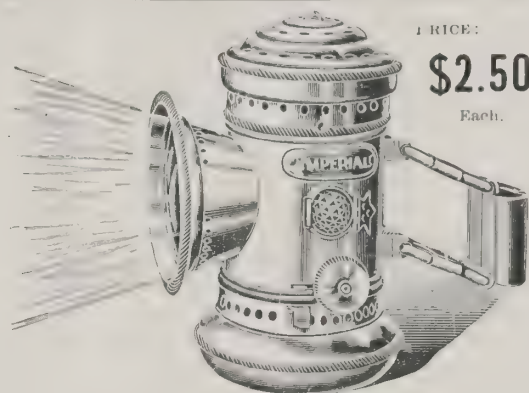
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They will neither blow out nor jar out.  
They are strong, safe, clean, attractive.  
They are made from the very best material and possess positive merit.

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OUR WHEELS ARE

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Send for accurately illustrated catalogue and discounts.



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Do Not Ride a Rail, But Ride the Up-to-Date

### Wheeler Reform Saddle.

No saddle soreness, nothing but comfort when it is used. If your dealer has not got it, write

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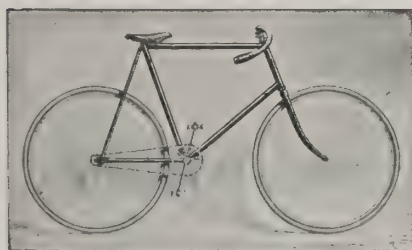
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SUPERB — OWEN BICYCLES — SUPERB



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Workmanship.  
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WE NEVER COPY;  
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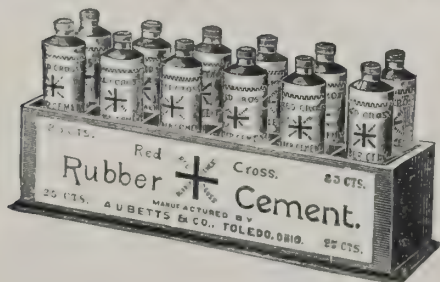
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THE OWEN OUT-COASTS THEM ALL.

Write for Catalogue and Terms.

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RED CROSS.

Send for catalogue of Red Cross Specialties. Sample Tube by mail, 25 cents. Ask your dealer for it and take no other. Manufactured by

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AGENTS WANTED.

Correspondence Invited.



GOODS GUARANTEED.

Catalogues on Application.

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PROMPT SHIPMENTS,  
TWO YEAR GUARANTEE.

HIGHEST GRADE WHEELS AT  
LOWEST PRICES.



### Importers

SHOULD BUY NOTHING BUT  
THE BEST.

Our Bicycles are carefully boxed for shipment. We have a New York agent to attend to securing low rates on ocean shipments and marine insurance. Our prices are not the lowest because our wheels "are not" the cheapest. "IT WILL PAY YOU TO BUY THE BEST." Satisfaction guaranteed.

## RALPH TEMPLE CYCLE CO.

204 35th STREET,

CHICAGO, ILL., U. S. A.



### New Octuple Printing Press.

THE marvelous evolution and development of the printing press in general, and a masterly tribute to the genius of the American designer, is shown in a new octuple press just installed in the press room of the New York *Herald*. The new press is technically known as a Goss straight-line octuple press, and has a capacity of turning out no less than 96,000 copies of six or eight pages, say 768,000 pages per hour.

It is built upon a principle which is a new departure in newspaper printing machinery and one which promises to have a marked effect upon the press rooms of the future. It is worth more than a passing notice.

This monster press is built in tiers one above the other, and thus affords economy of floor space, which is a valuable consideration in the modern press room. The machine has four decks and is capable of being operated as two independent quadruple presses, or, in combination as one octuple press. In other words, this one press can print two entirely distinct newspapers at the same time. Whether these papers be duplicates of each other or different is merely a question of plates. The press is also capable of printing six or eight page papers, ten or twelve page papers, and combinations may be effected to turn out papers of any even number of pages up to thirty-two. For instance, a fourteen or sixteen page paper can be delivered in book form, or in two sections, folded together and delivered as one product. The same method also applies to the other combinations from eighteen up to thirty-two pages.

The running speed of this press an hour, exclusive of stops, is as follows: 96,000 copies of 6 or 8 pages, 72,000 copies of 10 or 12 pages, 48,000 copies of 14 or 16 pages, 24,000 copies of 18, 20, 22, 24, 26, 28, 30 or 32 page papers.

Rolls of paper, which if unreeled would reach from a mile to a mile and a half, are placed on arms or levers, at the rear end of the press. The paper is sixty-three inches in width, and it forms what might be called an enormous ribbon. This ribbon or web, as the printers call it, is fed continuously into the press. It moves through so rapidly that the eye can scarcely follow it, but here is what happens to it. As the web enters the press it meets a set of cylinders, to which are attached eight plates, each one of which represents a page of the *Herald*. The paper is pressed against the cylinder and receives upon one side the impression of eight pages. A little further along it meets another set of cylinders holding eight more plates, and the other side of the paper is printed with eight pages directly opposite the first eight. The printing thus being completed the web of paper is carried toward the front of the press, passing a device which pastes the pages as it goes. Arriving at the front of the press the paper is folded, counted and laid out in packages of fifty. Not only does the machine count the papers it delivers, but it is provided with a self-registering indicator, which shows at any time the total number of papers the press has printed.

Some of the features of this press that are novel might be pointed out. In passing through the press the several webs of paper are brought together in a direct line before reaching the folder, the association of the four webs, when the press is in full commission, making a sixteen page paper on each side of the press, or two complete sixteen page papers at each half revolution of the printing cylinders. The web of paper during this process travels in a direct course from roll to folder, and the angle-bar method of turning the web and deflecting it from its course to one at right angles is eliminated.

Another feature in this method of construction is one that will be readily appreciated. It is well known that a sheet of paper will stand an enormous strain if brought evenly and equally, but that if applied to one edge it parts most without effort. By the angle-bar method of associating the printed webs to complete the paper the strain was greater on one edge than the other in passing over the turning bar, and the liability of breakage of the running paper greatly increased. With this method, which is known as the straight-line press, the web is drawn into and through the press in a straight course, with an even, equal pull that much lessens the liability of the web to part. This is a material gain in time, and economizes in labor and waste, and at the same time largely adds to the productive capacity of the machine.

Another desirable feature of this machine, and one that is peculiarly its own, as it is the first built with this improvement, is that one of the objections that has been urged against the multiplication of rolls of paper in a single machine is because of the increased necessity of stopping to supply paper, when the whole mechanism is brought to a standstill. This press, when run as two entirely separate presses, saves time in changing a plate or putting in a new roll of paper, as each part stops independently of the other, while the other continues its work undisturbed by what its companion is doing. This, it will be seen, must largely add to the productive capacity over a press that necessitates the stopping of the entire mechanism at every occasion for a halt.

The press can be loaded with eight rolls of paper 36 inches in diameter, so that the only delay after the consumption of one roll is to paste the end of the second roll already on the bracket to the first and continue with the run. Another roll can be placed in position while the press is running and is ready for the same operation. This makes a saving in time of from one to three minutes on each roll of paper, and means an hour saved in a night's run. Each press or deck also has its independent means for driving the ink supply and distribution, so that in case of accident to one the others are intact.

Still another feature is the simple and effective method used to associate sections forming a complete paper. This was formerly effected by what is termed "cutting and collecting cylinders" when the pages were imposed upon the press in such manner that one section followed the other on the running web in regular order, and the first being cut off was held and carried around

the cutting cylinder and then released with its companion as it was severed from the web. This required delicate and intricate mechanical appliances. In the new Straightline Goss press this collection of the sections is effected without mechanical devices other than a pair of adjustable rollers to carry and connect the association of the sections in proper register. The sections are imposed upon the press side by side. After receiving the primary fold the folded web is carried across and associated with that from the other side, and they pass together between the cutting cylinders, are cut off and folded again and delivered together.

One very essential gain in this method of construction is the saving of power necessary to drive over that of machines involving the angle-bar method of associating pages. With the presses standing at right angles to each other mitre gears were necessary to change the direction of the run of the presses, and, again, to drive the folder, thus getting further and further away from the initial driving point and working at a tangent. In this press the driving gears are all on one side and in a direct line, transmitting the action by short path to the most extreme point.

This machine especially commends itself for the small space it occupies, the length of the press over all being 20 feet and 7 inches, the width 7 feet and 5 inches, and the height 12 feet. By adding two more decks to the machine at a future date the capacity would be increased to 144,000 papers of six or eight pages per hour, and no greater floor space would be required.

The New York *Herald* has now in operation, two octuple, two sextuple, three quadruple and one fast color presses, with a total capacity of 500,000 eight-page copies per hour. The press room, as is the general custom in all large offices, is in the basement, but the ceiling is lofty, and through the plate glass windows surrounding the entire room a complete view of the workings of these mammoth and intricate machines may be had at any time from the Broadway pavement, a privilege daily appreciated by thousands of sightseers and other interested spectators.

### New Warships for Japan.

TWO war vessels for Japan are now being built in this country—one at Cramp's yards in Philadelphia, the other at the Union Iron Works in San Francisco. Some little interest is manifested in the construction of these two vessels for at least two reasons: First, on account of possible complications with Japan upon the Hawaii matter; and, second, for reasons connected with our newly awakened national intelligence on naval science and architecture. Furthermore, these vessels are of different construction from Uncle Sam's powerful coast defenders, and this renders them still further objects of curiosity.

Both vessels are modelled after English designs represented in the Yoshino, built at the Armstrong works, which took part in the sea fight of the Yalu. The displacement is 4,700 tons, a little more than the displacement of the American vessel *Chicago*. The Japanese vessel is 396 feet long on the water line, the *Chicago* 325 feet. The beams are nearly the same. The draught of the Japanese vessel is to be 17½ feet, against 20½ feet for the *Chicago*. The Japanese vessel is but 16 feet shorter on the water line than the *Columbia*, one of our first class vessels, although its displacement is 2,700 tons less. The new vessel must necessarily have great speed. The requirement is 22½ knots.

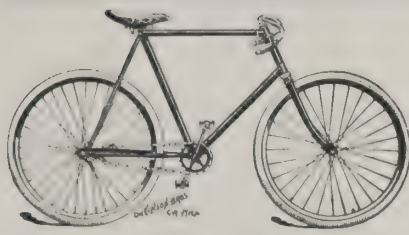
The armament of the new warships is better than that of American vessels of the same displacement. The main battery consists of two 8 inch and ten 4.7-inch quick firing rifles. We have none of the former guns in our navy as yet. A calibre of six inches is our limit so far in quick-firing guns. An American 8-inch breechloader will fire one 250 pound projectile in 90 seconds. The new Japanese vessels will be able to fire four 210 pound shells in 64 seconds. The great advantage thus rests with the Japanese vessels. The ten 4.7-inch rifles will give them no advantage over American cruisers. Their secondary battery consisting of twelve 12-pounders and six 2.5 pounders gives them an advantage over our largest cruisers in this kind of warfare. The new Japanese vessels thus have the advantages of high speed, great length and superior armament. Coupled with quick manoeuvring their better ordnance should render them dangerous antagonists when manned by the quick and shifty Japs.

### Canned Goods for Europe.

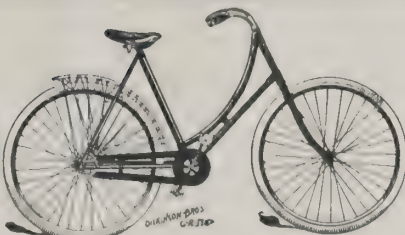
CONCERNING the pack of Alaska salmon for 1897 a contemporary from the Pacific Coast says: "Fully 75 per cent. of the red have been placed, with orders still coming in. The quantity allotted of this kind for the domestic trade is said to be 250,000 cases. The very low prices at which the fish is sold combined with its good standing with consumers make large handlers take hold freely, well knowing that no risk is run. We are not advised as to what is doing in pink. Since writing the above we are in receipt of advices from Astoria to July 12th, which state that the good run of fish continues and that it looks like a pack of from 350,000 to 400,000 cases. From all that can be learned we feel warranted in believing that the Pacific Coast pack this year will be a record breaker. Last year the total was over 2,300,000 cases, which was fully 300,000 cases over that of the previous large pack."

—A report from Knoxville, Tenn., states that an English syndicate has purchased nearly all the coal mines in the Jellico district of that State, comprising over 100,000 acres of land and including upwards of seventy-nine mines. The purchase price is not given, but the first payment of \$5,000,000 is said to have been made, and the mines will be opened up immediately. It is understood that the entire output is intended for export.





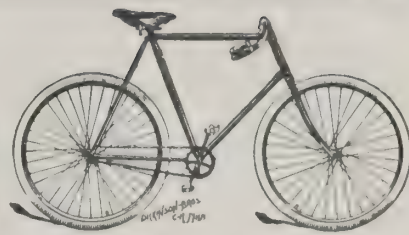
Halladay Roadster, \$100. Discount, 45 per cent.



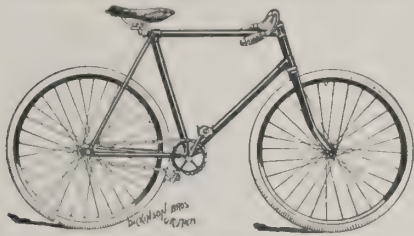
Lady Halladay, \$100. Discount, 45 per cent.



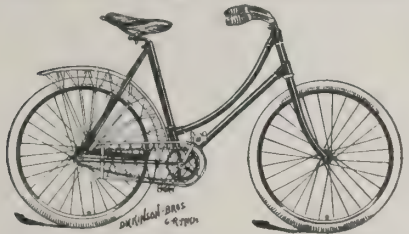
Lady Aetna, \$75. Discount, 50-5 per cent



Aetna Roadster, \$75. Discount, 50-5 per cent



26-inch Boys' Aetna, \$50. Discount, 40 per cent.



24-inch Girls' Aetna, \$40. Discount, 35 per cent.

## MARION CYCLE COMPANY,

MARION, IND., U. S. A.

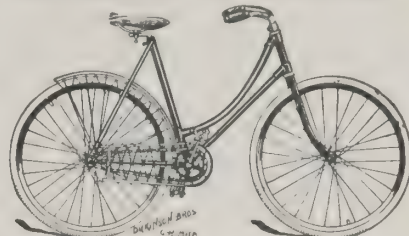
The Largest and Most Complete Line of Bicycles  
made in America.

## Halladay AND Aetna Bicycles

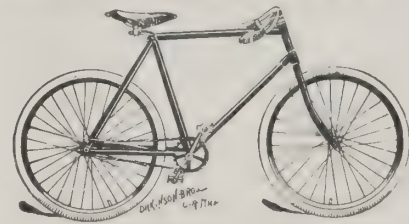
Strictly of the Highest Grade.

Absolutely Guaranteed.

Prices quoted with discounts are our BEST and cannot be beat for quality offered. Can refer to largest dealers in America. Complete line for reliable service. Orders accepted through reliable commission houses. Mail exact copy of order direct to us. Direct orders must be accompanied by Draft on New York or San Francisco. All goods carefully boxed for ocean shipment, F. O. B. New York; or delivered San Francisco or New Orleans, \$1.00 net extra per machine. Send for Art Catalogue mailed free.



26-inch Girls' Aetna, \$50. Discount, 40 per cent



24-inch Boys' Aetna, \$40. Discount, 35 per cent.

SYLPH  
BICYCLESRUN  
EASY

\$100.



The Best, Easiest-Running and Highest-Grade Bicycles on Earth Are the  
'97 "BOLTLESS"

## "SYLPHS."

They contain more up to date and practical improvements than any other machines, and are acknowledged to be, both at home and abroad, the finest machines made.

They are ESPECIALLY adapted for Export Trade. We are appointing agencies in many foreign countries, and we want to hear from reliable agents in all countries. Our "Sylphs," together with a full line of "OVERLAND" Cycles, are money catchers, and you will make a mistake if you fail to write us before you contract.

"OVERLAND" Cycles, all sizes, all patterns, \$40.00 to \$75.00.

**ROUSE, HAZARD & CO., Manufacturers, Peoria, Ill., U. S. A.**

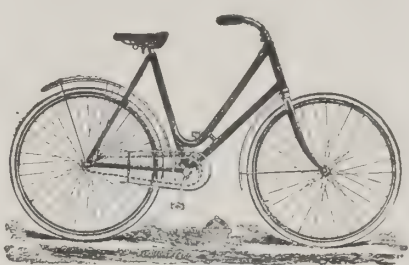
## GOOD AGENTS WANTED

TO REPRESENT

## The Standard Wheel OF AMERICA.



Write for Terms.



Write for Catalogue.

**STANDARD BICYCLE MFG. CO., 71 Jackson Blvd., Chicago, Ill., U. S. A.**

**P. H. MAYO & BROTHER, INCORPORATED,**  
RICHMOND, VIRGINIA, U. S. A.

Manufacturers of

**PLUG TOBACCO FOR EXPORT.**

CORRESPONDENCE SOLICITED.



## The BUTTERFLY Bicycle Seat.

Conforms by means of adjusting bar to the exact contour of the anatomy of the body. It is practically two natural moulds upon which the human form can rest. These moulds are responsive to every motion of the limb. A boon to both sexes.

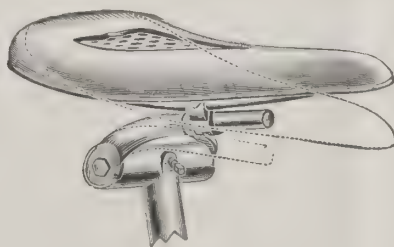
**Price, \$4.00.**

Catalogue mailed on application.

**Butterfly Bicycle Seat Co.**

36 Congress Street,  
CHICAGO, ILL., U. S. A.

## Goodenough Spring Seat Post.



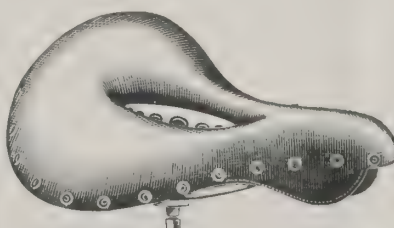
Dotted Lines Showing Action of Saddle.

**A. C. GOODENOUGH, Rochester, N. Y., U. S. A.**

**F. A. HOLLENBECK & CO., - Syracuse, N. Y., U. S. A.**

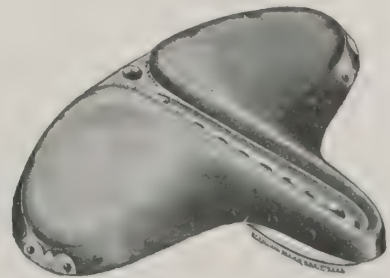
Manufacturers and Exporters of

**BICYCLE SADDLES.**



Orders filled through Commission Houses.

Catalogue 3 on application.



Correspondence solicited.

The spring, being horizontal, has a different action from any other seat spring.

It takes up the action of the wheel and relieves the rider from shock and recoil.

It can be adjusted to any wheel, and any saddle can be used with it.

It gives to the saddle a leverage motion instead of a direct motion, the saddle being attached by a lever to the outer ends of the spring, the center of which is held stationary by an adjusting screw.

It does not change distance between saddle and pedals, the rear of saddle remaining practically stationary.

It admits of adjustment of tension, to suit the different weight of riders (see cut).

Send for Catalogue "R."



## Miscellaneous Notes.

—A San Francisco establishment has recently received an order from Germany for dried fruits amounting to \$22,000.

—We are credited by Mr. Alfred De Lissa, in a paper read before the Chamber of Manufacturers of Sydney, Australia, with being the greatest manufacturing country in the world, and with producing about one-third of the manufacturing total of nations.

—The Secretary of Agriculture is going to Colorado and other Western States for the purpose of studying Western horses, and considering what improvements should be made in them in order to fit them to be war steeds and otherwise attractive to the European markets.

—The Marlin Fire Arms Company have just issued a very attractive new catalogue. In addition to the complete list of arms and ammunition given, the work contains a variety of information in regard to rifle and cartridge which will prove interesting and valuable to the trade.

—The well known firm of James Leffel & Co., Springfield, Ohio, U. S. A., has issued a neat new pamphlet "D," replete with numerous illustrations and descriptions of the throttling and automatic engines with portable and stationary boilers, which they are building in a variety of sizes and styles.

—An ordnance company of Bridgeport, Conn., has concluded a contract with a South American government for three forty-knot torpedo boats. The president of the company, when questioned upon the subject, admitted the truth of the statement and stated that work upon the engines had already begun at the Bridgeport shops.

—Negotiations are now in progress with the French Government looking to the conclusion of a treaty of trade and commerce to govern the relations between the United States and Tunis. This is to take the place of the old treaty, which does not fit modern conditions, and particularly the existing protectorate over Tunis maintained by France.

—Out of every 1,000 horses exported, 412 go to the United Kingdom, 297 to Canada, 124 to Germany, 47 to Mexico, 29 to Belgium, 22 to Central America, 15 to France and 54 to other countries. The United Kingdom takes nearly all the cattle we ship, 96 7 per cent. of the total, with only 3.3 per cent. for the rest of the world. This percentage is increasing, for in 1896 Great Britain took 98 3 per cent. of all of our cattle, France and Germany, two of our largest patrons formerly, having shut out our cattle altogether.

—The commercial community of Philadelphia is elated over the news that it is soon to have an important addition to its transatlantic steamship service. To the efforts of the Freight Bureau of the Trades League the enterprise is mainly due. With an intelligent appreciation of the foreign freight service of the port they have worked indefatigably to bring it about and must be congratulated upon their success. The new line will be known as the Philadelphia Transatlantic Line, and will operate between that port and London. Arrangements have been made with the Philadelphia and Reading Railway Company for close traffic arrangements which will materially aid the new enterprise. The establishment of this line will insure competitive conditions in the ocean service between Philadelphia and London.

## A Nicotine Absorbent Tobacco Pipe.

A MANUFACTURING firm of Philadelphia has perfected and patented a nicotine absorbent ventilated tobacco pipe which will appeal to all pipe smokers and which must, in consequence, receive favorable consideration at the hands of the trade.

Users of tobacco in the form of pipe smoking need not to be told of the annoyance and vexation frequently experienced by the clogging of the pipe, from the accumulation of moisture nicotine and impurities at the base of the bowl and in the stem. In this way the pipe not only becomes strong and foul but the flavor of the tobacco is ruined, and it is a troublesome matter to keep it lighted. For these reasons, too, the pipe owes much of its asserted unhealthfulness and its offensiveness to non-smokers.

The improvements made in the new design form the subject of three patents and are meant to do away with these difficulties.

The bowl is connected with the mouthpiece by a perforated metallic central stem portion, inside of which is placed an absorbent blotting paper tube. The absorbent tube is made of fourteen layers of interleaving blotting paper, and the perforated stem always allows the free circulation of cold air around the paper tube, thus evaporating all moisture and cooling the smoke, the nicotine being condensed upon and absorbed by the blotting paper. When the paper tube becomes saturated, which may be from one to three weeks, according to the practice of the smoker, a new tube may be inserted without soiling one's fingers, thus cleaning and renovating the pipe. A package of tubes is sold with each pipe.

## Furniture for London.

GRAND RAPIDS, Mich., papers say a representative of Maple & Co., the largest housefurnishers in London, England, if not in the world, was recently in that city negotiating the sale of Grand Rapids furniture for his house. If this great English house has determined to offer American furniture in its salesrooms, it may mean a great deal to United States furniture makers, more especially to those who are willing to study English taste, and manufacture furniture to suit it; for if one great London house makes a success of our furniture, naturally its competitors will be forced to take it up also.

## Useful Inventions.

THE irrepressible inventor of this country has found a great field for his genius in the supplying of household conveniences, and it is safe to say that the work of the kitchen has been very materially lessened by these contrivances during the past few years. Egg beaters, cherry pitters, pea shellers, raisin seeders and similar culinary contrivances are now found in every household and have become necessities. Women occasionally are inventors of very clever devices in this line. For instance, a Philadelphia girl, as told in the *Record* of that city, has recently had granted to her a copyright on a fruit shredder, consisting of a kind of fork with long, sharp, strong prongs, adapted readily to shred any kind of fruit. Another Philadelphia girl has devised a very ingenious and practical cherry pitter, which has quite struck popular fancy and sprung into favor.

The latest invention in coffee pots, the novel feature of which consists in having the spout detachable, so that a strainer cloth can be used in connection with the ordinary metal one, and which at the same time can be easily removed for cleaning and renewing.

Another new design for household use is a carpet beater, which, from its extreme simplicity, consisting of a single piece of wire bent into the form desired, may be very cheaply made. Another and quite as important a feature is that it enables one to beat the carpet, too, without the necessity of taking it up, and the hand is thoroughly protected while beating the flat surface, the construction being such that the knuckles cannot be struck.

No more tearing of the cloth when a button is pulled. At least so its inventor claims. His idea is to have a pair of disks of a sheet metal pivoted at one edge and having curved slots in them. When these disks are removed they completely cover the cloth, except where the button sewing projects through.

Another girl's idea, a very good one, too, is a device which allows a woman while carrying her ordinary leather purse in her hands to have free use of them for holding her skirts, parasol or parcels. She accomplishes this by means of a finger loop, formed of a single piece of ornamental wire bent to form a loop and attaching ends for holding the purse. Little projecting caps are also provided so that the wire cannot injure the leather at the ends where the greatest wear would be.

A little novelty made its appearance for the first time last year, when silver corncob holders were sanctioned by Dame Fashion. The ends of the holder are mounted so as to slide along a straight box, thus accommodating any size of ear, while the pins at the ends of the small semi-circular arms hold the ear firmly in one position. No doubt this little device will popularize eating the corn from the cob, which always seems to give it a distinctive flavor.

## Harder than a Diamond.

THE United States Patent Office will shortly grant title in a discovery which has a right to be considered probably the most remarkable since that of the X-ray. The inventor is Mr. Moisson, the French savant, and his claim is for a substance harder than the diamond. This is the same Moisson whose experiments in the art of artificial diamond-working have attained such wide publicity. Notwithstanding that the utmost secrecy has been maintained the fact is revealed that the substance in question is a carbide of titanium, that is to say a compound of carbon with the metal titanium.

There can be no doubt that its production in quantities will revolutionize many industries where abrasives are employed, and it may even be used for the cutting of diamonds.

Titanium is one of the most interesting of the rare metals. It is about half as heavy as iron, and, like the latter, it is white when perfectly pure. Chemically it resembles tin, while in its physical properties it is like iron. The familiar mineral "rutile" is an oxide of titanium, and is used to give the proper color to artificial teeth. A small quantity of the mineral put into the mixture for tooth enamel produces the peculiar yellowish tint that counterfeits nature so admirably.

Titanium has no other commercial use than this. There is none of it on the market in the metallic state, and probably not an ounce could be obtained at any price by advertising for it. Dealers in rare metals will quote you gallium at \$3 000 an ounce, germanium at \$1,125 an ounce, rhodium at \$112 an ounce, ruthenium at \$90 an ounce, iridium at \$37 an ounce, osmium at \$26 an ounce and palladium at \$24 an ounce; but they have no titanium to sell, because there is no demand for it, and also for the reason that it is extremely difficult to separate from the substances with which it is found combined in nature. At the same time there is no doubt that plenty of it could be produced at a very moderate cost if a large demand should spring up. Though classed as a rare metal, it is not really such, inasmuch as it is a common impurity in iron ores.

THE steamer Lady Furness has sailed for Japanese ports, and her cargo consisted chiefly of manufactured goods. The following items with their respective values were some of the shipments made to Yokohama only: Locomotives and parts, \$42,000; nails, \$19,000; steel rails, \$24,000; railroad material, \$5,000; cigarettes, \$10,000; iron pipe, \$6,000, and lubricating oil, \$11,000. To Shanghai the same steamer took machinery valued at \$24,000; domestics, \$315,819; cigarettes, \$14,000, and hardware upward of \$5,000.

—The recent strong demand for American paper from abroad still continues, and some heavy orders have just been placed by English purchasers. One American mill alone will ship upwards of \$20,000 worth of paper for newspaper use within the present month.





## SHERMAN BICYCLES

Two Models: - \$75 and \$100.

Discount, 50 per cent. F. O. B. New York. Orders accepted through reliable Commission Houses. Always mail copy of order direct to us. Direct order must be accompanied by cash.

**THE SHERMAN CYCLE CO.**  
CHICAGO, ILL., U. S. A.



## "KOZY" BABY SEAT



20,000 IN USE.

LIGHT, SAFE, COMFORTABLE.

Can be readily attached to, or taken from, any bicycle. Does not interfere with rider. Adjustable for children of all ages.

Retail Price, \$2.50.

Best discount to the trade, 50 per cent. off. This is our best price on any quantities (two dozen in a crate). In ordering through export agent send duplicate order to us.

**GEO. HILSENDEGEN,**

Manufacturer, Detroit, Mich., U. S. A.



**HENRY A. BROWN,**

Manufacturer and Exporter of

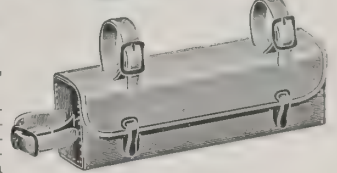
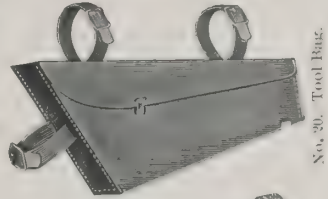
Bicycle Saddle Leathers,  
Bicycle Tool Bags,

ALSO

Leather Goods,

54 TAYLOR ST.,  
Springfield, Mass.,  
U. S. A.

Illustrated Catalogue D on application. Correspondence solicited. Orders filled through commission houses.



No. 30. Tool Bag.



## HIGH-GRADE LEATHERS FOR EXPORT.

**OOZE CALF.**

A very soft leather in unfadable colors, peculiarly adapted for wear in warm countries.

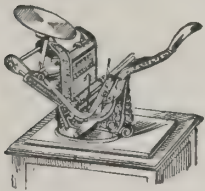
Both of the above leathers are especially suited for shoemakers in the Colonies and Mexico. Send for full information direct or through your commission house

**BOX CALF.**

A bright-finished black leather of extraordinary wearing qualities. Never hardens or cracks.

**WHITE BROS. & CO.,**

**BOSTON, MASS., U. S. A.**



**BALTIMOREAN  
Printing Presses**

With Outfits  
from \$1.00 to \$100.00 each.

Sales 1895, 15,000 Presses.  
Send for Catalogue.



**Rubber Stamp Vulcanizers,**

Steam and Dry Heat,  
with Outfits.

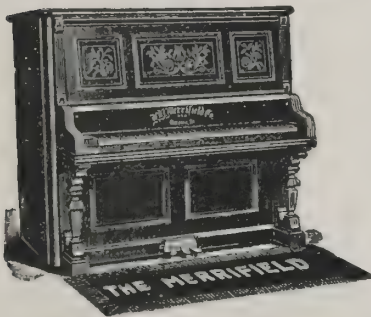
With Outfits from \$10.00 to \$1,000.00. Used all over the world.

STEEL AND BRASS DIES FOR ALL PURPOSES.

ALL TOOLS AND SUPPLIES FOR STAMPS AND STENCILS.

**THE J. F. W. DORMAN CO.,** Baltimore, Md., U. S. A.

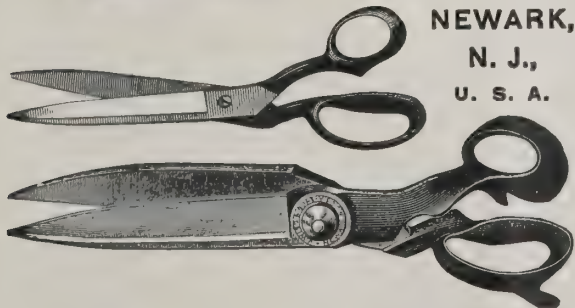
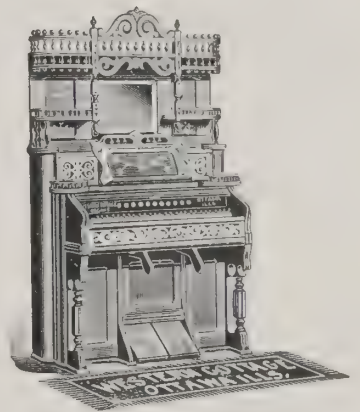
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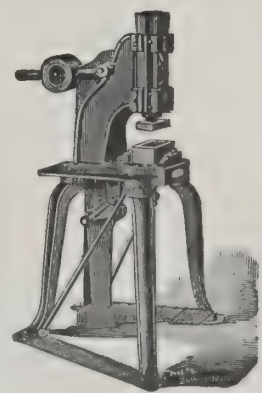
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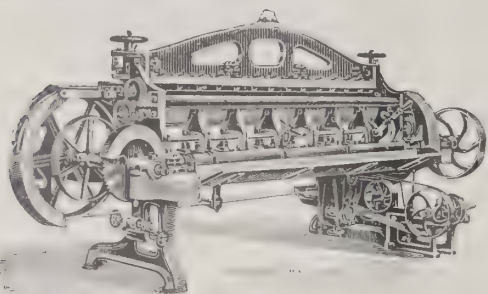
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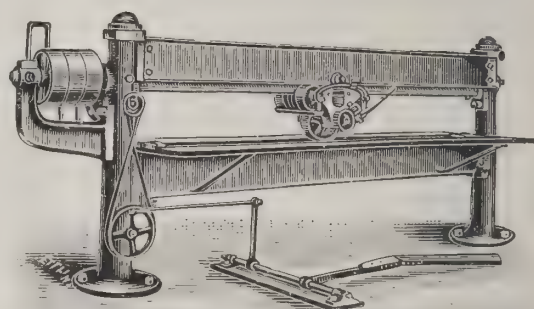
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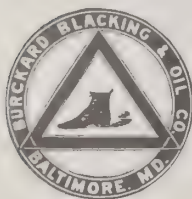
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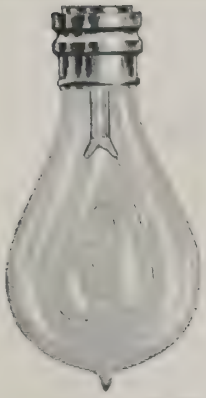
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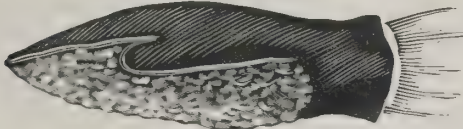
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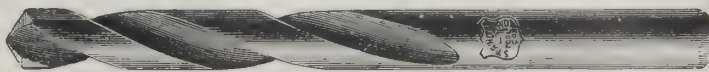
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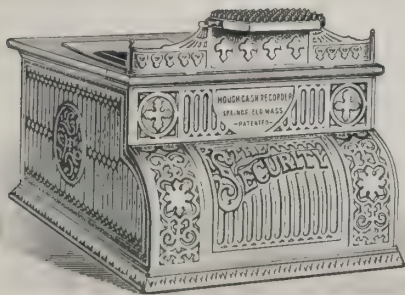
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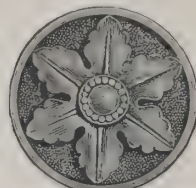
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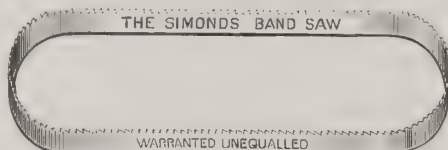


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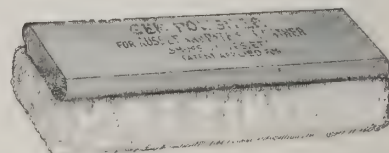


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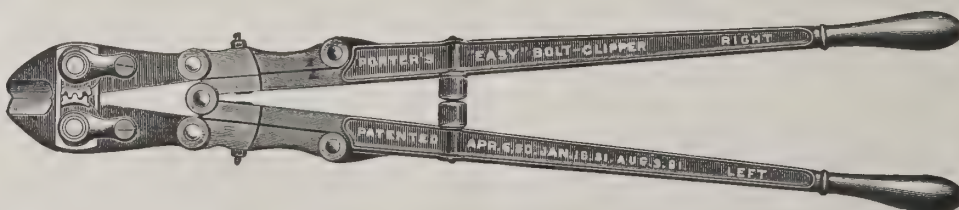
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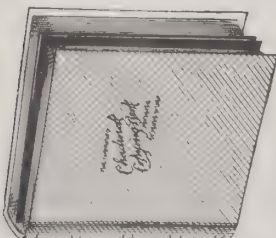


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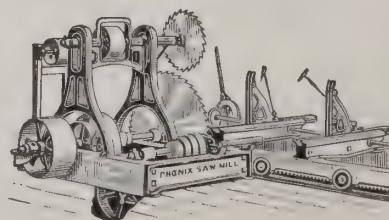
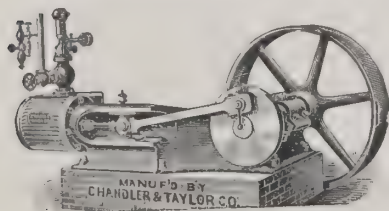
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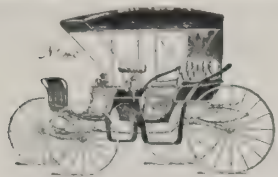
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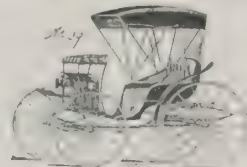






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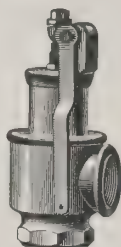
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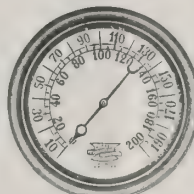
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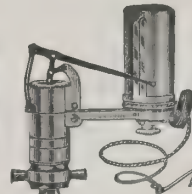
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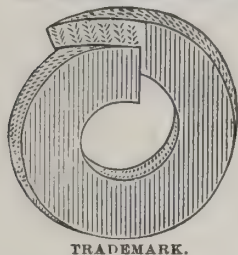
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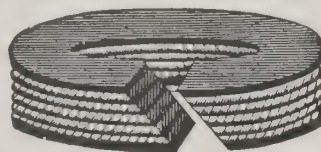
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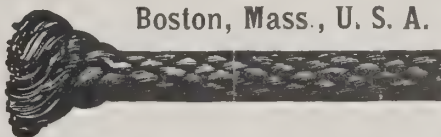
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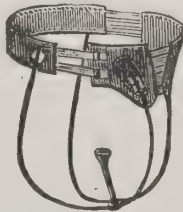
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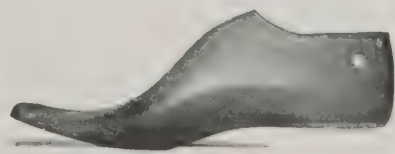
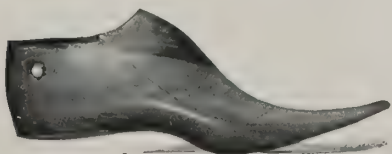
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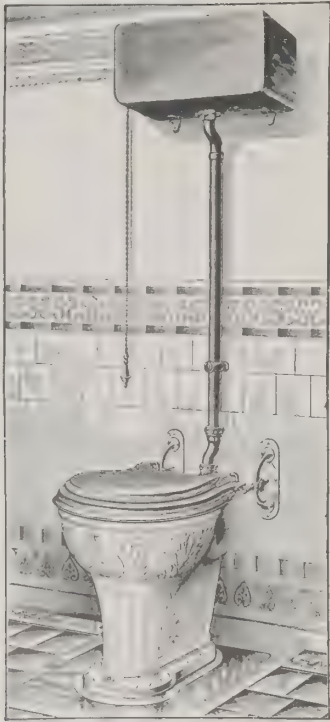
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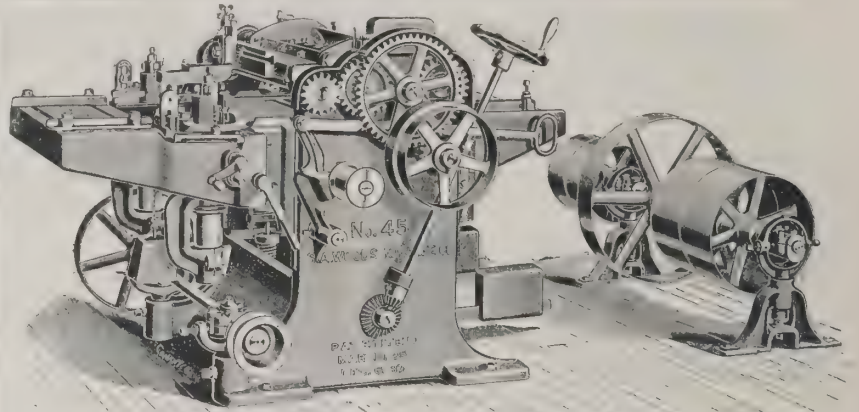
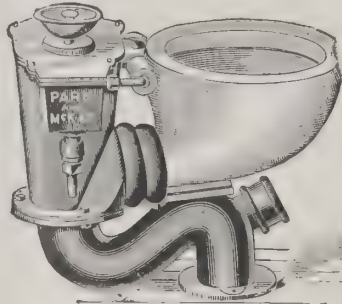


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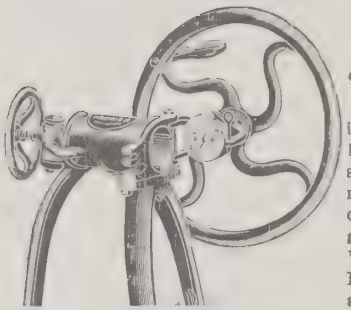
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For Railroads and General Lifting Purposes. Adopted by the Roadmasters' Association of America. Other Jacks have merits, but not one of them unites the advantages possessed by the

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No. 543.—Immaculate Conception. Base, 9½ inches each side. Height, 9 feet 9¼ inches.

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**"NEW JERSEY" COPPER PAINT**

**LEADS THEM ALL,**

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We guarantee this Copper Paint to be the easiest to apply and, owing to its being so finely ground, it is the smoothest paint in the market.

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**NEW JERSEY RED COPPER,**

For Yachts. Brightest Color Made.

**NEW JERSEY SEAM PAINT,**

A Perfect Substitute for Pitch.

**NEW JERSEY PAINT WORKS,**

HARRY LOUDERBOUGH, Proprietor,

JERSEY CITY, N. J.

U. S. A.

**REMARKABLE FACT.**

This cut is a copy of a photograph of a board having one end painted with New Jersey Copper Paint, manufactured by Harry Louderbough, proprietor of NEW JERSEY PAINT WORKS, Jersey City, N. J., U. S. A., and placed in the water at Port Royal, S. C., for five months. Upon the unpainted end you can note the ravages of the salt-water worm so destructive to wood, and also the large number of barnacles that have fastened upon it. Observe the painted end, where New Jersey Copper Paint was applied—its splendid condition.

The board here represented was placed in the water at Port Royal, S. C., by me, and left in the water five months. The painted end was as good as when it was placed in the water.

MILLS EDWARD, Master Schooner "Florence Shay."



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Newest, Most Perfect Driving Outfit Produced.

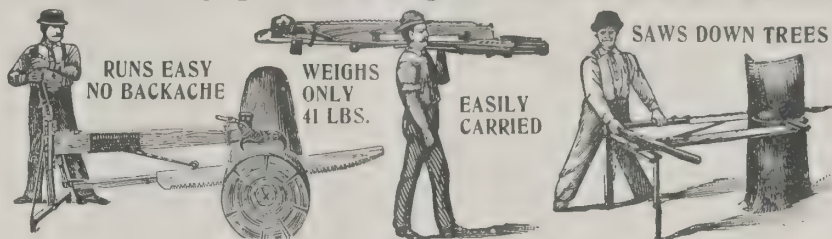


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PATENTEES AND EXCLUSIVE BUILDERS,

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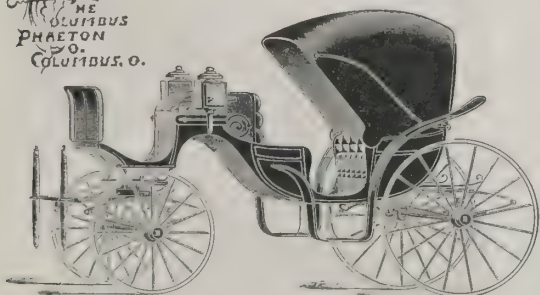
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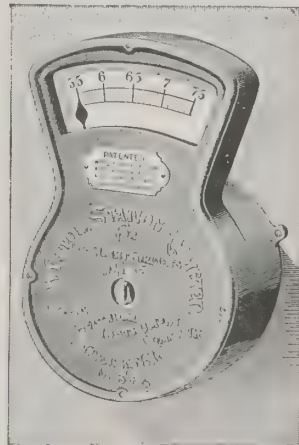
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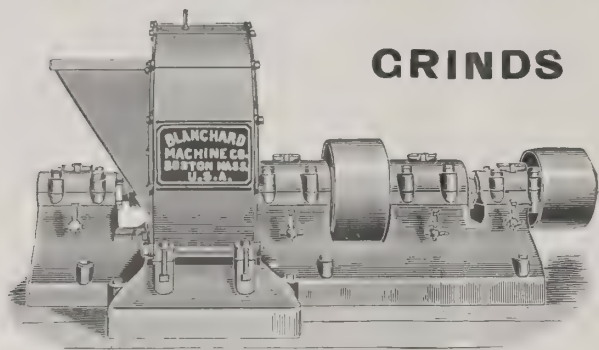


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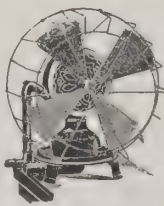
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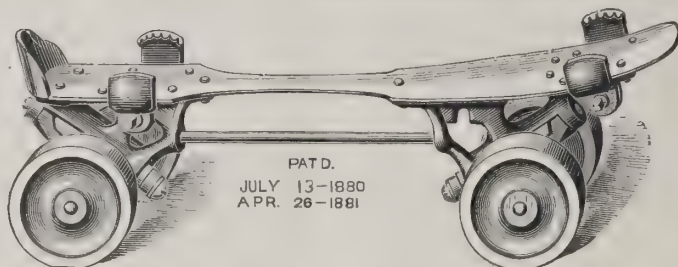
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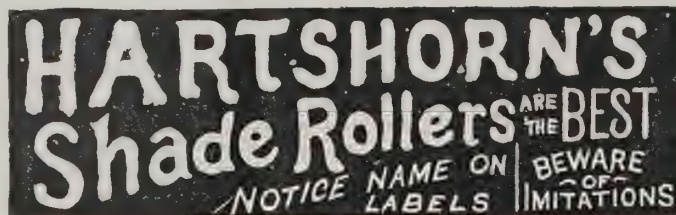
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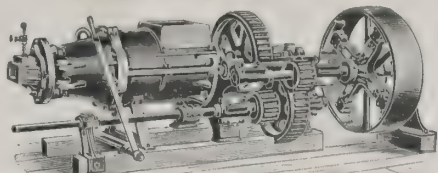
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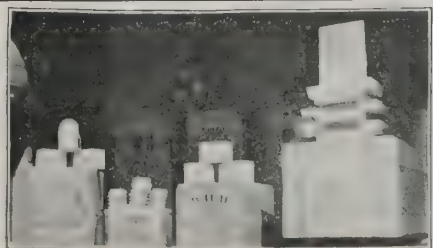
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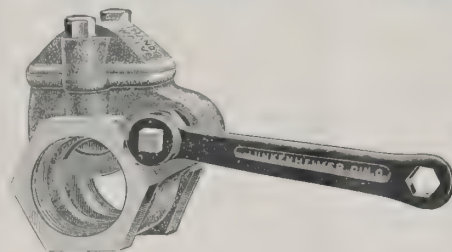
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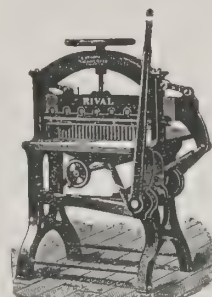
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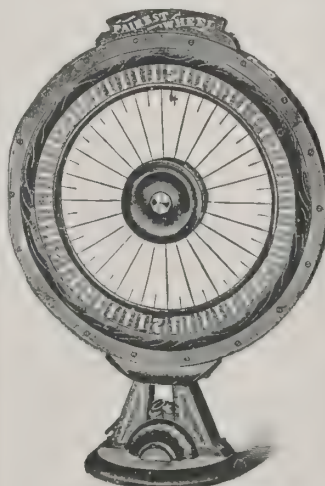
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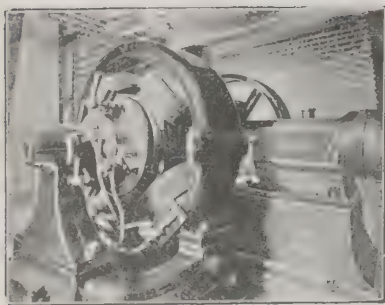
**DECATUR FAIREST WHEEL WORKS,  
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Patented May 7, 1895.

This machine is fully covered by Letters Patent No. 538,916, and all infringements will be prosecuted to the fullest extent of the law.





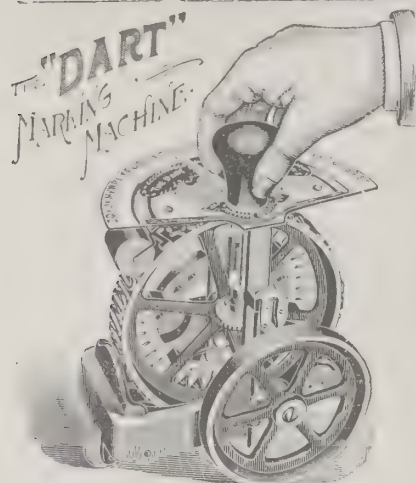
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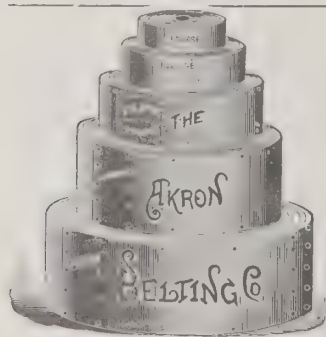
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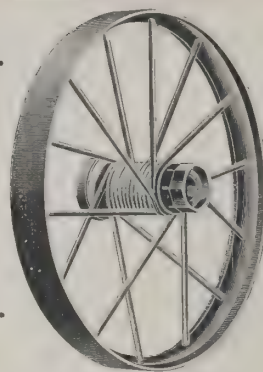
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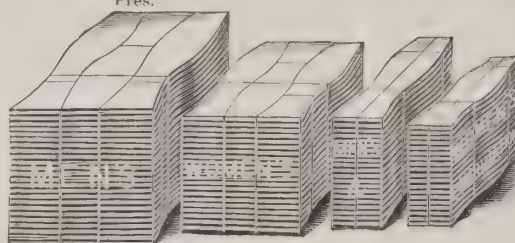
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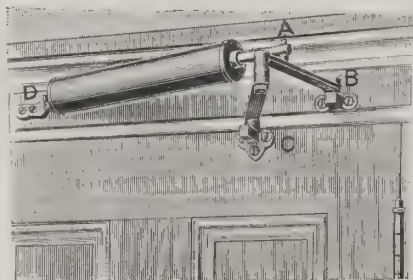
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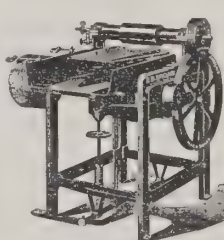
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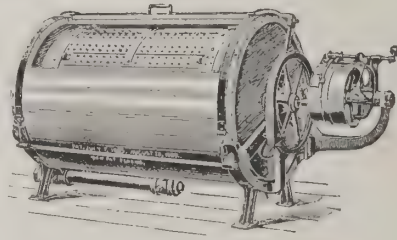
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Estimates furnished  
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Patent Aut. Wire Straightening and Cutting Machines;  
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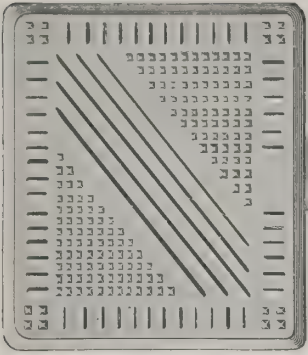
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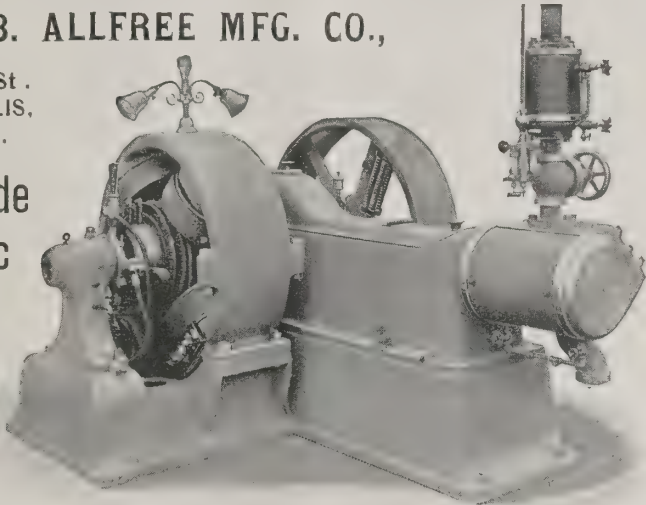
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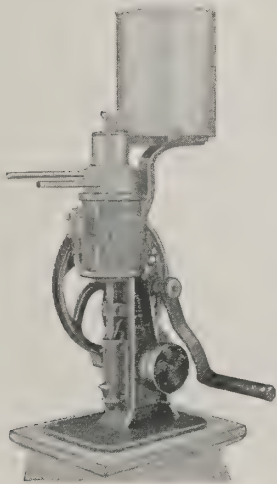
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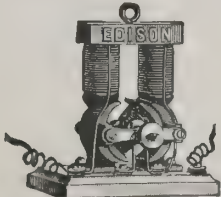
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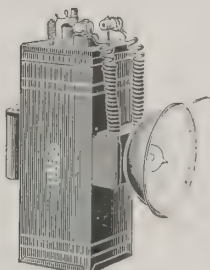
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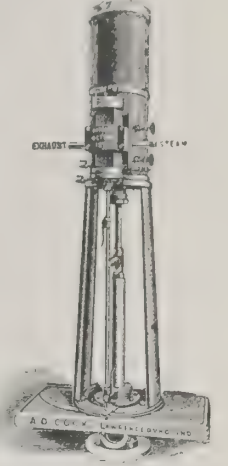
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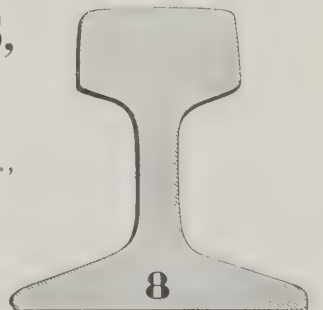
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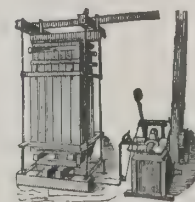


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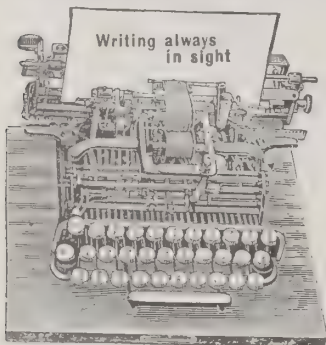
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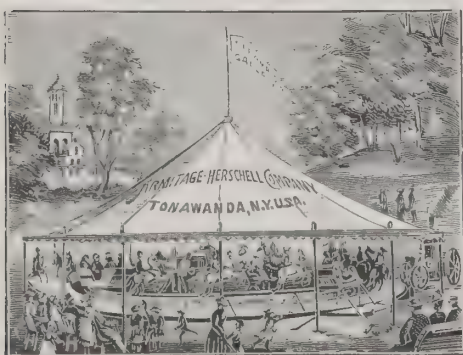
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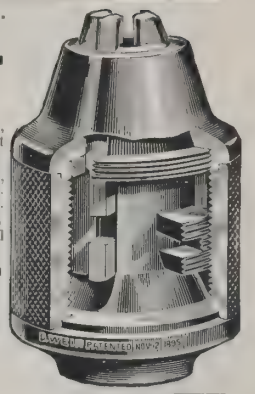
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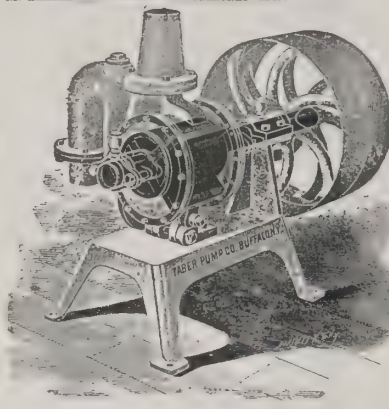
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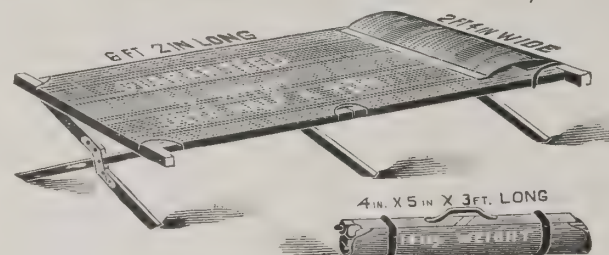
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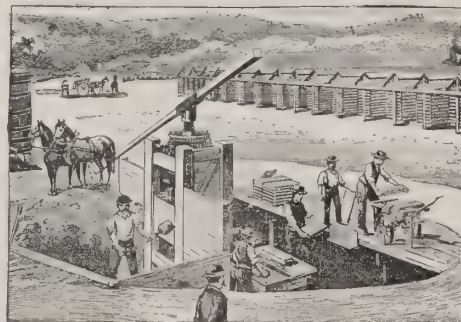


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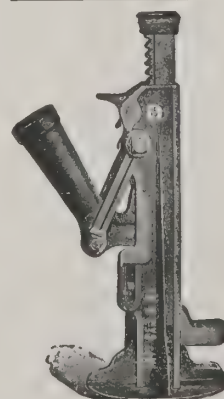
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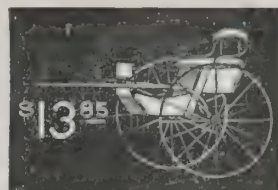




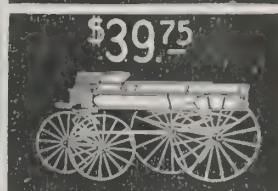


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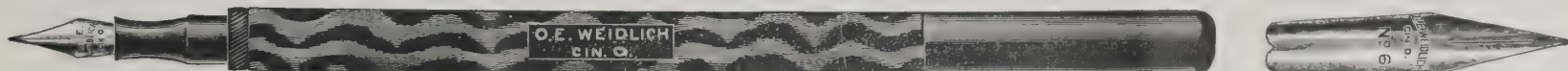
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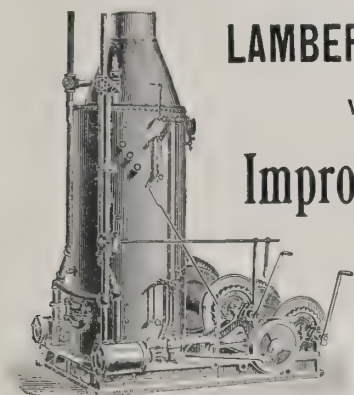
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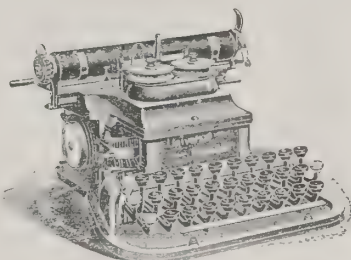
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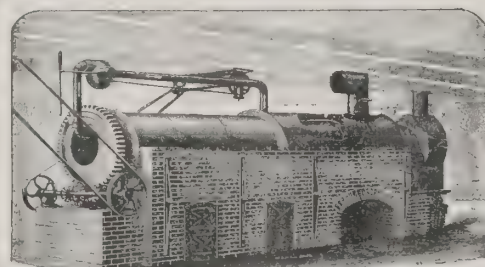
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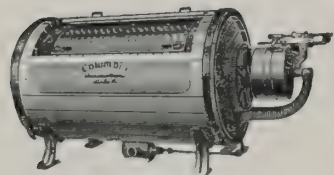
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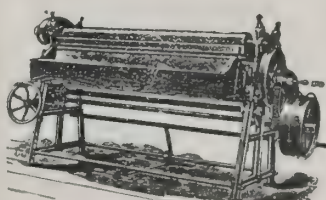
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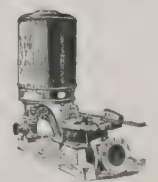
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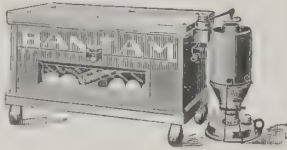
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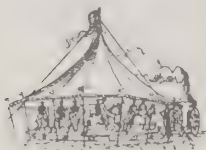


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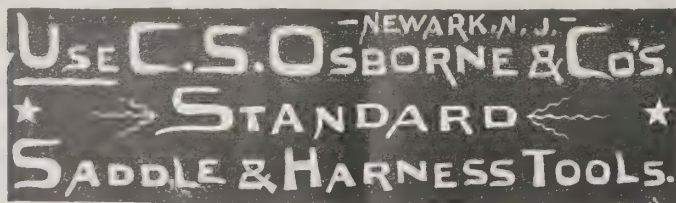
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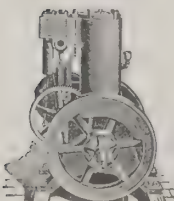
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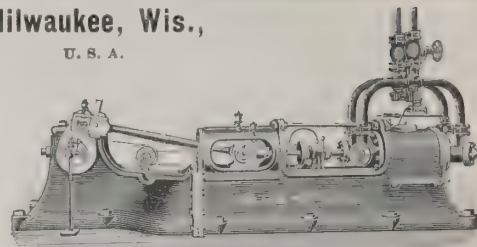
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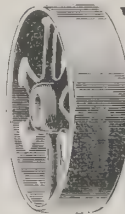
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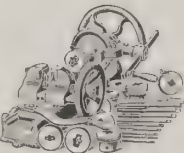
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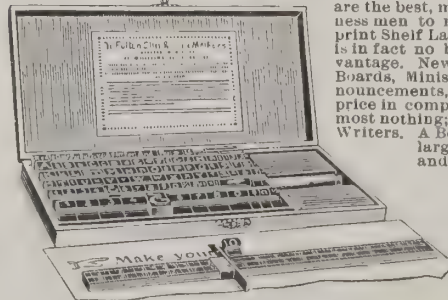
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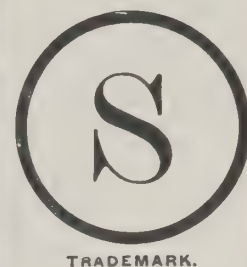
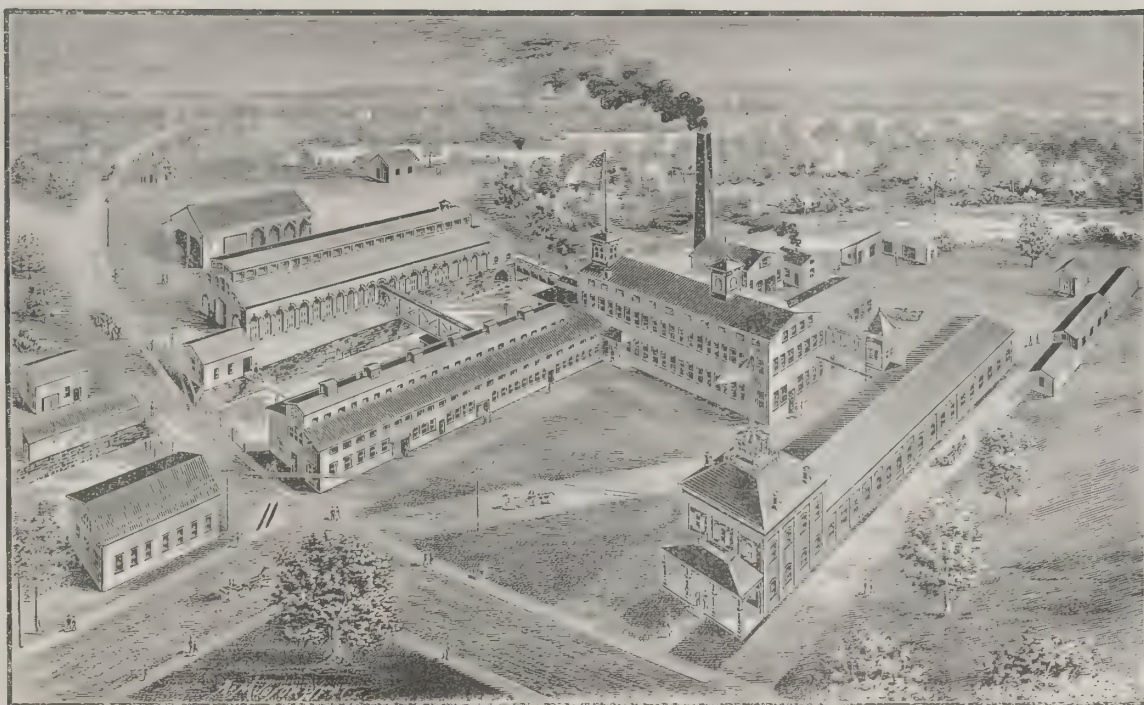
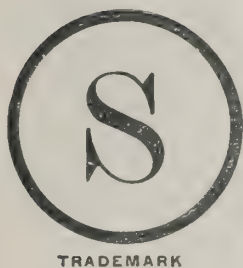


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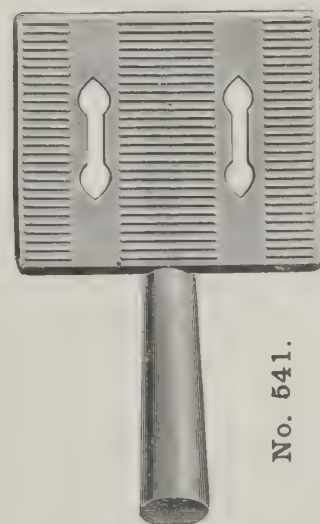
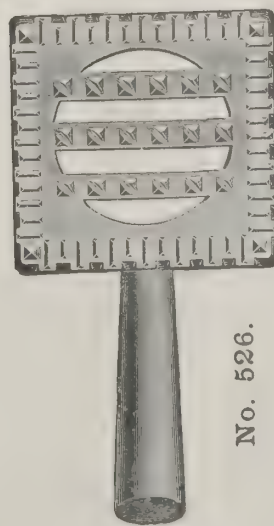
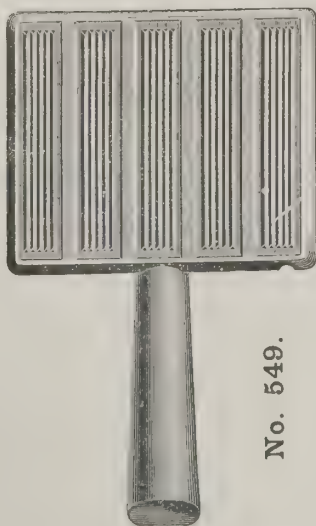
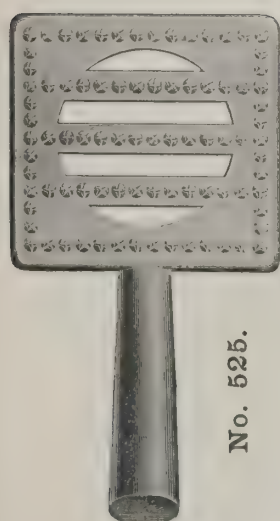
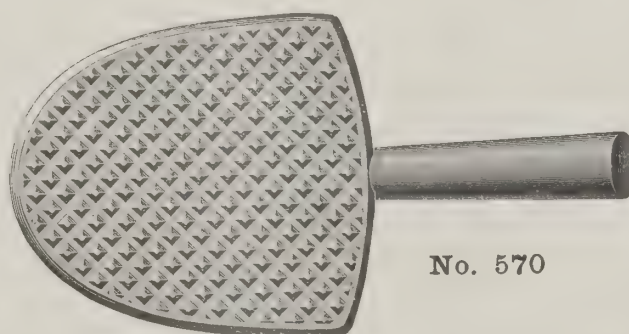
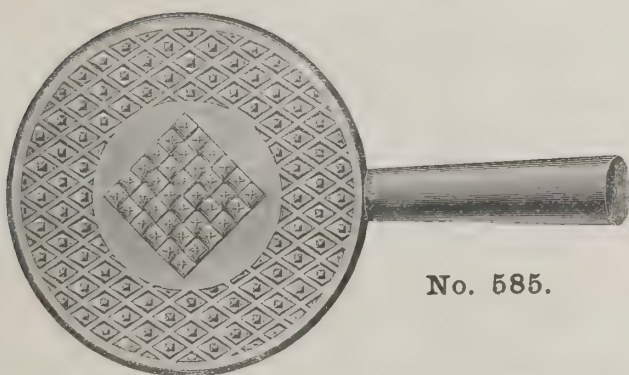
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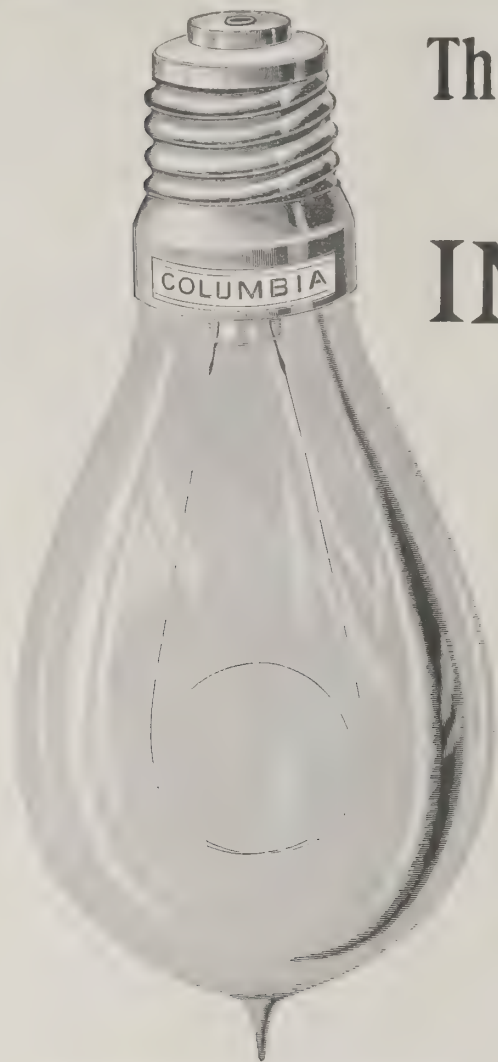


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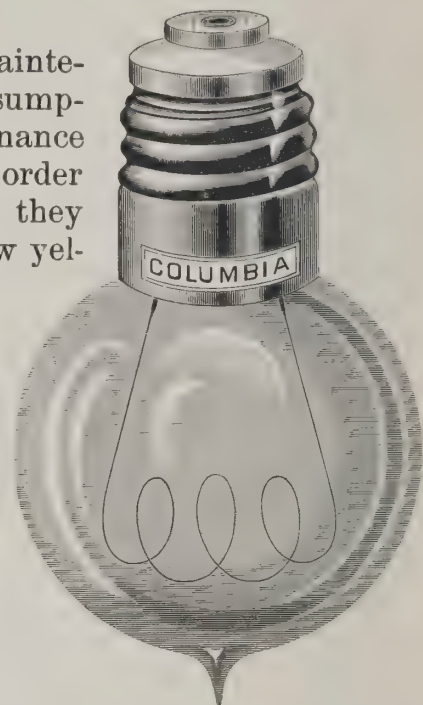
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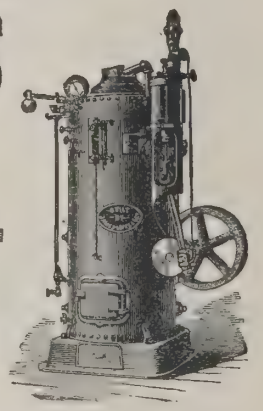
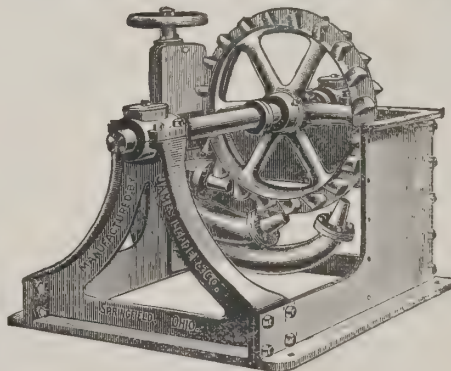
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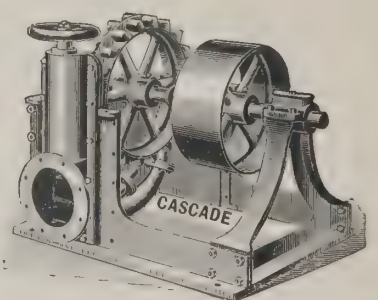
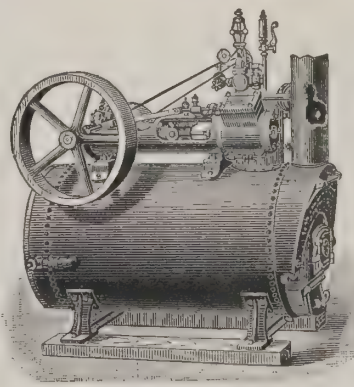
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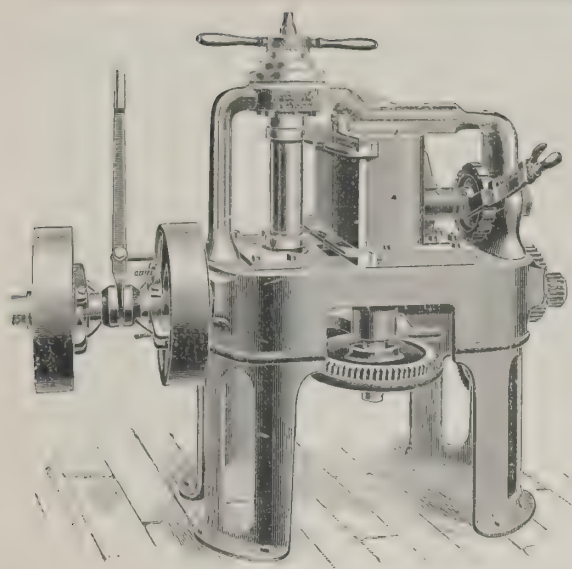
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SPRINGFIELD, OHIO,

United States of America.





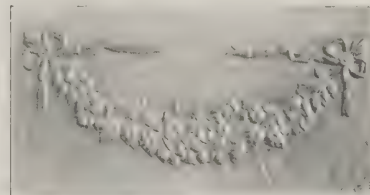
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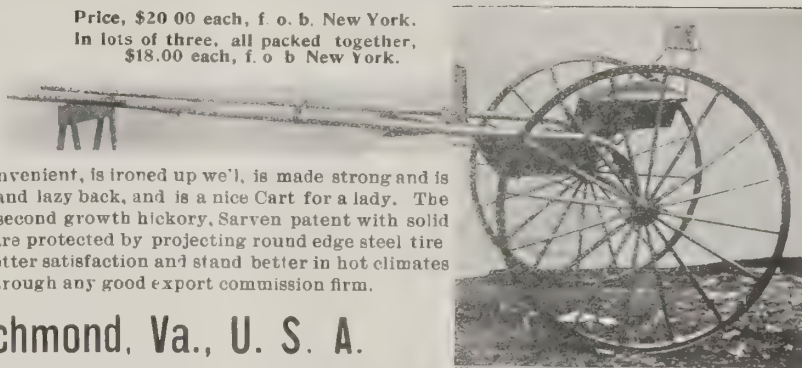
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SUITABLE FOR BATHS  
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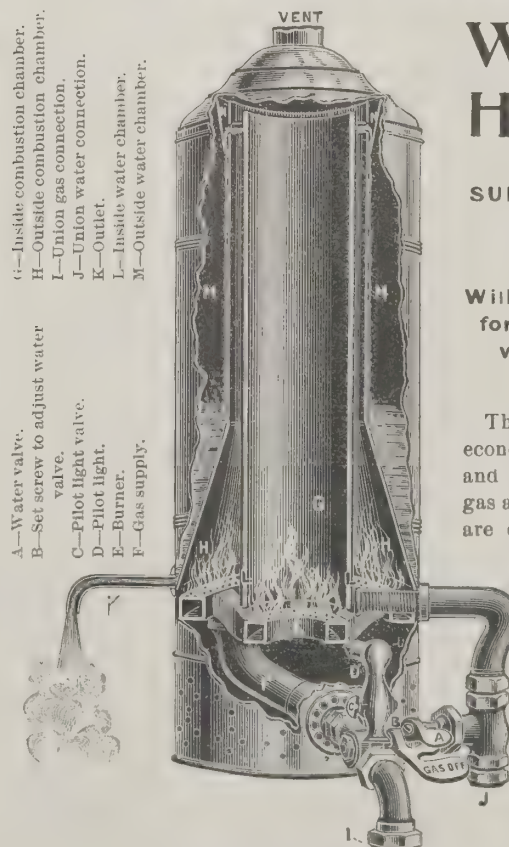
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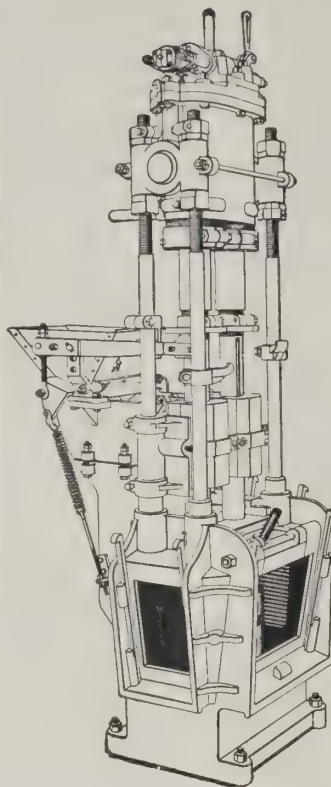
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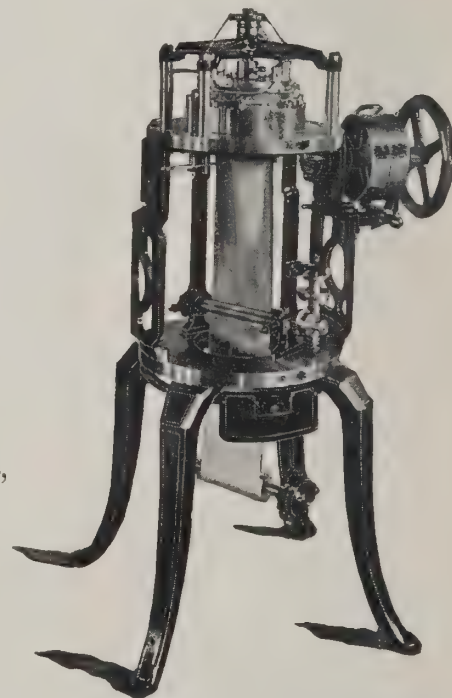
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# THE AMERICAN EXPORTER

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## A PREGNANT CRUISE.

THE distinguished literary gentlemen who discoursed about "A Tour All Around My Room" and "The Autocrat of the Breakfast Table" produced entertaining and instructive volumes, which have been translated into many languages. They did not have a more inspiring text than can be found in a brief cruise among our advertising columns. They are brimful of evidences of achievement and advance in appliances of modern industry and the enhancement of the conveniences of modern civilization. It is twenty years now since THE AMERICAN EXPORTER started. It was the pioneer of the revival of exports from this country, which once had "vexed every sea with our ships," but which had fallen into decidedly "inocuous desuetude." When it appeared its advertising columns were speedily filled with notices of things strange and rare, and many of its pages with careful elucidations of these matters which were little understood except in limited circles even among the most progressive merchants. Expositions in various countries, some of the grandest proportions, others of a more local and restricted scope, have brought all nationalities together and have worked for good in the direction of stimulating trade and inventions everywhere. THE AMERICAN EXPORTER is a perpetual exhibitor, and wonderful indeed are the things to be found therein. There is the manifestation that peace and plenty follow the kindliness of mutual intercourse between the nations, that our exports mean more exports for other peoples and that daily we find examples to prove the accuracy of the statement that to-day the peasant and artisan enjoy, at the lowest cost, luxuries which princes never dreamed of at any cost, even so late as one century ago.

Running backward through our August issue we find first the notice of the Thomson Meter Company, which has just hilariously celebrated the sale of its first 100,000 machines. The National Meter Company, which has a world-wide reputation and trade. Then we find "Savage rifles for savage game," an all-round weapon which can safely fire six different kinds of cartridges under varying circumstances—to kill an elephant at a mile or a squirrel at 50 paces. The Blakeslee veneer cutting machine suggests that in the not remote future enterprising men will be found filling ships from yet unexplored regions in South America and the islands of the Far East with veneers from woods yet unknown to the general world in compact form ready for instant cabinetwork, thus usefully modifying the present clumsy method of transporting logs, some of the finest of which are simply impossible to get out of the woods and over mountains in bulk. (We have seen one mahogany tree in Honduras 10 feet in diameter, which, with its "fantails" and "logruds," would be equal to a small gold mine, but it had seven mountains between it and the nearest water course of sufficient magnitude to float it. A

machine on the spot could make it and its innumerable smaller neighbors merchantable.) Next we find specialties in shoe polishes, etc., suggesting our vast trade in boots and shoes and the hides we must import to help our own raw material and the hides that after peculiar preparation we are able to export. Then come the pumps in every form, from those suitable to the kitchen of a settler's cabin to machines able to pump out a mine. The tubular rivets and studs, which, as parts of the excellent imported sole-leather trunks which are now indispensable for the travelling man, we recognize as certain international friend-makers. Another manufacturing company shows a line of camp furniture which suggests a breezy life in the forest like a whiff from a wood fire. The automatic steam engine presents itself as a devoted and reliable slave for many purposes as effective as the djinns who obeyed Aladdin. It is impossible, however, within the limit of this article to specify or even to allude in the briefest terms to the other articles offered for sale in any sort of detail. Suffice it to say that everything to be found in the long catalogue of our advertisers is of the best, supplying some need of humanity in a way that has never been surpassed, if equalled, and on terms which, as international banking facilities and commercial ratings become better systematized—there is room for a great deal of improvement in this direction—will be found satisfactory. There are engines for steam, gas, gasoline and electricity; there are presses and printing machines to supply the wants of the largest newspaper or the convenience of a small storekeeper who may need to print labels. Musicians will find the delightful accompaniments of their joys in many forms, while economical "merry-go-rounds" are ready to be shipped anywhere, and in the not remote future we may find the jocund shouts of riders thereon perhaps among Esquimaux, Siwash and others on the Klondike or in the midst of the Afridis on the Hindoo Koosh with the Mad Mullah himself as the chief rider. Clocks and watches, from the affair that retails at \$1 to the tower clock suitable for halls of legislation, are on hand. Food products, from animated eggs in patent hatcheries to condensed milk or canned fruits, are all ready for instant service. The toilet is catered for from tooth washes to perfumes. Fountain pens, typewriters and stationery of all kinds appeal to the busy promulgator of ideas and information. Tobacco machinery is offered which some day may be found superior to indigenous methods in far Sumatra and may develop hitherto untried fields in Mexico and South America. We show laundry machinery of wondrous capability and concentrated economy, and vehicles of all kinds, from wheelbarrow or pushcart to the great trucks for transporting merchandise or the most elegant of pleasure carriages. The wonderful Australian "oat hay," prince of fresh forage, first introduced in 1865 by way of saving a crop threatened with drought, is rivalled by our new "sacaline." We have brickmaking machinery, and if the world used more bricks there would be less wood wanted, and the fertility of much fine land now menaced with desolation would be conserved. Wood needs water and forests attract moisture. We have well-drilling machinery which, if adequately applied, would convert Sahara into one great oasis. Hydraulic presses for baling goods or extracting oils are in evidence. We have hammocks with American improvements that would soothe the brains of the most active conspirator in the lands of the *maguay* or the *coroso*. For sport we have the latest developments in billiard tables, slot machines, toys and games of every variety. We have honey and beeswax. We have motor fans to blow away flies and mosquitoes and induce balmy sleep in the fiercest tropical heats of Perim or Yubadam, windwheels of wood or galvanized iron that defy storms and work ungrudgingly night and day, never strike, never get drunk, never talk back and never even groan if properly lubricated once and awhile, faithful and admirable servants! We have medicines of the greatest hygienic value to make life happy and prolong it. Our steamships or smaller craft, from a dingy or a "knockabout" yacht upward, will be found admirable for war, peace, traffic or diversion. We can ship at a moment's notice statuary in metal suitable for the embellishment of parks or the gardens of palaces. In sanitary appliances we show a great choice of the newest and most practical inventions. Decorations in pressed wood, leather, wall paper and artistic carv-



ings appeal to the eye of the æsthetic and the wealthy. We can export carpets and silk manufactures, and our cotton goods are staple. Calculators and busy men will find a choice of most elaborate and accurate counting machines. Beautifully designed tin boxes, tags, etc., are available for manufacturers abroad who have good things to send us so labelled. From machetes to keen razors we offer superior cutlery, and as to bicycles and their congeners, for two, three, four or more riders, the variety is endless, and they, with all the appliances which are innumerable, are all good and reliable. We have woodworking machinery of every kind, and lamps and lanterns of great excellence and extraordinary cheapness. Our schools have long been our greatest pride, and for the spread of education everywhere, and for the convenience of teachers and pupils, we have ready the most admirably arranged school furniture, globes, blackboards, etc. We import many of our best teachers, which is reciprocity, and reciprocity, good feeling and confidence are what will bring about the confraternity of nations and perpetual and universal peace. To that end we work humbly, faithfully and hopefully.

### ELECTRICAL PROGRESS.

PROGRESS in the varied uses for electricity in this country has been so wonderful and swift, and the changes brought about in the condition of things around us have been so great during the past few years, that even the most extravagant prophecies in regard to the future of science would hardly seem to be overdrawn. Who can predict what discoveries may not yet be made? The past has shown that the bounds of human insight to invention are very hard to set. The wonderful Roentgen ray was merely a myth three years ago. Many master minds had referred to it prophetically, but their predictions were generally received as rather extravagant credulity. All the wise men of the past failed to note its existence, while for years it had stood directly in the path of science almost begging to be discovered.

In the United States we claim supremacy in steam mechanics, machine tools, agricultural implements and in the number and ingenuity of our labor-saving devices. For the same reason that made us expert in these things it is but natural and reasonable to suppose that America should lead in electrical engineering. These reasons are very apparent, for in no part of the world is the need of electrical appliances more keenly felt.

The United States has an area of 3,595,600 square miles and a population of 65,000,000, quite evenly distributed. The ingenuity of inventors was therefore taxed to devise improved means of communication between the people so widely scattered and to afford rapid and easy methods of transport throughout this country of magnificent distances. Hence the speedy development of the telegraph and telephone and the wonderful improvements in both steam and electric traction service. The attention to these things naturally brought about new discoveries and inventions, and as the superiority in any line of manufactured goods will generally be found in that country where necessity and demand for them are greatest, we have reached a state of perfection and development in electrical appliances manifestly in advance of our neighbors.

We have had, too, a source of advantage in the acquiring of knowledge that is not enjoyed by other nations. In the constant stream of immigration to the United States from every corner of the globe came many skilled mechanics. They brought with them the secrets of their various crafts, and from the knowledge thus gleaned was laid the foundation of America's progress as a manufacturing nation. Force of circumstances and natural ingenuity built the superstructure.

We learn a lesson from the history of the world, particularly during the last 200 years, which shows us how the results of the scientific method of discovering truth have added materially to the intelligence of the human race, and increased in a marvellous degree the luxuries, conveniences and power of mankind. Then, again, the ancient suspicion and antagonism to science have long ago passed away, and it would indeed be strange if the people living

now had not acquired such great confidence that they are led to believe in and expect even greater things as discovery follows discovery and the theories of yesterday become the facts of to-day.

The limit of perfection in telegraph and telephone has not yet been reached. Nearly a dozen years ago the possibility of a wireless system of telegraphy was predicted. The past year has brought about its development. By the new system the conducting wires are dispensed with and the signals enter and ring bells in closed boxes. Even solid walls of stone and brick present no obstacle, while fog and mist and storm are unable to cut them off.

One of the greatest hopes of the electrical engineer to-day is that the time may not be distant when far more light and power will be obtained from a given amount of electric energy than is now possible. There is a great waste under present methods in the transmission of electric currents to great distances. When ways and means are devised to prevent this the world will have reached another revolutionary stage in its scientific and commercial advancement.

Even now we in America are experiencing a wonderful change in our mechanical methods which promises to add very materially to advantages we have already possessed. We refer to the harnessing of our great water-powers for the development of electrical energy to drive our railways, to operate our machine shops and to supply light and heat to great distances with wonderful convenience and at comparatively trifling cost.

One immense plant for this purpose is already operating at Niagara, and another is under construction at Massena on the St. Lawrence River.

From these places will be strung wires carrying a mysterious force hundreds of miles to workshops and tramways. Soon we may expect that cities will be lighted, houses heated and food prepared by light and heat drawn from the great waterways of America. A button is pressed, a knob turned, and here all apparent exertion ceases.

In the centralization of energetic forces at a common point the greatest power is derived at the minimum of cost, and the success of the experiment at Niagara is sufficient to lead us to expect that at some future date instead of various and innumerable power plants, each operating an individual industry, there will be a few giant plants along the great water courses of the United States that will supply motive force and electricity for all purposes to the whole country.

The operation of steam powers in many parts of the United States is of remarkably low cost, but the force lost in transmitting the power from the piston stroke to the machine through perhaps hundreds of feet of shafting and innumerable belts is very considerable. The projectors of the new electric system propose to convey their power direct to the tool. It may therefore be reasonably expected that the present cost of operating our mills will be fairly cut in two and domestic comfort and convenience increased at great reduction upon old-time expenses.

All this is a very fair promise which we are inclined to believe the next generation at latest will see faithfully fulfilled.

### THE ACCIDENT THAT NEVER OCCURRED.

MANY stories, some pathetic and some amusing, have been written about "the letter that never came." We now have a practical variation of the theme in a discussion that has for its point the accident that never occurred. It appears that a writer in *The Financial News*, of London, had directed attention to the seriousness of the competition of the American-made bicycle with domestic-made wheels in the English market. A correspondent signing himself "Common Sense" writes to *The Financial News* to disprove the existence of such competition, which he styles a "bogey." To prove his case, among other things, he says: "Let one of these bears take an American-made machine to a rural district and let the machine break down in any way and the rider will spend a few days writing to various agents for spare parts which are not kept in stock." To this the writer of the original article



presenting the serious aspect of the competition of American-made wheels in English trade replies: "It may interest 'Common Sense' to know that I possess an American-made machine upon which I have ridden over 2,000 miles and, unlike some English-made machines, it has never broken down and has never given me any serious trouble. I do not doubt had any such misfortune overtaken me as suggested by 'Common Sense' I could have found a dozen cycle component manufacturers who could and would have supplied any defective or broken part with the utmost ease." The moral of this story seems to be not that an American-made wheel never breaks down, but that before one rushes into print with an argument based on the supposition that an American-made wheel might break down it would be the part of wisdom for him to first find out what kind of a wheel his opponent rides.

### COLONIAL SECRETARY'S FOREIGN TRADE INVESTIGATION.

THE Hon. Joseph Chamberlain, Colonial Secretary, caused much comment in the commercial world a few months ago by issuing a general request to the Governors of all the English Colonies to report to him to what extent foreign imports were displacing imports from Great Britain, and the cause of such displacement. Reports, made in compliance with this request, have been compiled, and are now published in a Blue Book recently issued from the Colonial Secretary's office. At the time the call for these reports was issued there was much discussion as to its wisdom in English trade journals. Some contended that a similar request sent to English manufacturers and exporters engaged in the Colonial trade would have secured the information sought with equal reliability, greater promptness, and with less publicity. These journals thought the reports would contain information the publication of which would be detrimental to British interests. Other journals declared that the information obtained from the Governors of the Colonies would be more general in its character, bringing out many points that would be known only to those in touch with the Colonial end of the business, and would be a better guide for any contemplated action than information obtained in any other way. The disputants as to the policy or method of making this investigation are now in a position, with this report before them, to measure their theories by the obtained results, and determine the soundness or the unsoundness of their former views.

Judging from newspaper reviews of the contents of this Blue Book, English manufacturers and exporters will find in it much that will be useful in guiding their future efforts to extend their Colonial trade. Unfortunately for them, however, to the extent to which this investigation and report is serviceable for their purposes it will be correspondingly serviceable to their foreign competitors. Reports that tell English manufacturers and exporters that their commodities have been displaced by German or American manufacturers, because the latter have catered with better judgment to the requirements and preferences of Colonial customers, certify this information to the world; they advise German and American manufacturers that the policy they are pursuing is appreciated by Colonial consumers, and is the basis of their success in English Colonial trade. They clearly show that this policy intelligently followed will enable German and American manufacturers to retain the advantages they have won and to make larger gains.

It is far easier for those who have acquired the art and prestige of suiting Colonial or other customers to keep themselves in the lead than it is for those who have allowed themselves to be outdone in these respects to overtake and pass their successful rivals. To illustrate:

The report from Queensland states that 65 per cent. of the imported ammunition and 80 per cent. of the cement come from Germany. 75.90 per cent. of clocks and implements comes from America. 45 per cent. of the boots and shoes comes from Continental Europe and America. The New Zealand report says the United States supplies all the axes and hammers used there, and

that the reapers, binders, mowers and seed drills are nearly all American made.

These reports further specify that Colonial consumers appreciate goods that are of low cost, improved up to date, excellent in style and finish, and that British manufacturers are unable to compete or do not compete with Germans and Americans in these particulars. Quality being equal, price wins. The cheapness and suitability of American clocks and implements are unapproached by the manufacturers of any other country. American-made boots and shoes are rapidly growing in favor—not in English Colonial trade only, but in England, Germany, France and all civilized countries. Their style, durability, high finish and suitability win favor wherever they are known. American axes and hammers are lighter and in every way superior. Reapers, binders, mowers and drills, and all other agricultural implements of American manufacture, are lighter, generally cheaper, and more effective than those made in Europe.

In certifying to these and many similar facts the Governors of English Colonies have rendered a service of high value to the commercial world. Buyers of these articles, in whatever country they may be located, not excepting England itself are directed where to obtain such commodities to advantage from the source of original supply that is cheapest and best.

### AMERICAN FRUIT IN GERMANY.

THE city and county of Los Angeles, Cal., have taken political measures to familiarize Germans with the advantages of their locality for productive purposes and the practical value of the products. As complete a description of these points as can be made within the limits of a pamphlet has been prepared, printed in German, and shipped in good supply to the Hamburg Exposition. At the same time fruit raisers have sent for exhibition apricots, oranges, peaches, watermelons, golden Chasselas grapes, blue Damsion plums, Siberian crab-apples, Japan plums and apples. The variety and the quality of such an exhibit can well be expected to make a lasting impression on the minds of the German people. It is reported that orders have already resulted and a carload of dried apricots is now on its way to prove to the German in a most practical way that these things are as represented, not only the best of fruits for table use, but a luxury that the people can afford.

### AMERICAN MACHINES FOR WOLVERHAMPTON.

THREE American hub-turning machines, comprising two first-form turning and one finishing lathe, have recently been installed by a Wolverhampton (England) manufacturer. By this American plant the hubs are turned by an automatic process, the steel rods from which they are made being placed on a machine which, with practically no supervision, turns and bores both sections without the requisite lengths being first cut, as was formerly necessary. It is claimed that these machines do their work at nearly 50 per cent. less cost than is possible under the hand-turning process.

This statement, which appeared in the *Iron and Coal Trades' Review* (English), brings out in clear lines the advantages so often claimed by THE AMERICAN EXPORTER for American manufacturers: while they pay their workmen the highest wages in the world, by the use of labor-performing machinery in many instances the labor cost of their products is lower than the labor cost in any other country, not excepting the Oriental Yankees of Japan or the cheap-living Celestials of China.

There is in the United States much expressed sentiment about the dignity of labor. But the dignity comes in by devising a machine to do the work and employing an intelligent man to see it run.

The American mechanic is the last man in the world who will perform any labor that he can put upon a machine. If he gets a job that he cannot find a machine to do it is a torment to him until he finds or invents a machine that can do the work while he does the thinking. The result is good pay for the man, good attention for the machine and a good, low-priced product for all the world.



## HOME AND FOREIGN PRICES.

WHETHER protection or free trade is or is not best for this country, or for those who are or may be in commercial relations with us, has never been a topic for discussion in THE AMERICAN EXPORTER, and for the time is but a moot point anywhere. The tariff has been decided on and bids fair to remain with few modifications, as it is for some time. And for so much relief, much thanks! When the inevitable arrives, it is philosophical to make the best of it. Whatever grievances now exist with importers or others will after awhile cease to afflict. Asperities will be softened and shrewd business men will so shape things that we shall discover the world has not come to an end because each and every one of us could not have things our own way. There is a good deal of judicious whip-sawing to be done, and live men are bound to even things up after awhile. In the old, old days that we read about, when Marco Polo traversed Cathay and the scarcely less authentic Robinson Crusoe made piles of money by wandering from one place to another like a modern tramp steamer, merchants made one hand wash the other very comfortably, and amid perils of sea and land, assailed by storms, robbers or pirates, and fleeced by arbitrary assessments, to which our tariffs are but flea bites, often managed to accumulate, in a dogged, laborious way, great wealth, and they could see how they got it. If they lost here they made there. They were both exporters and importers. The subdivision of modern trade has somewhat confused the ideas of people and made apparently inharmonious conditions which rightly taken make for the general good. As the late lamented General Hancock observed, "Tariff is a local issue." He was laughed at when he said so, but the fact is he was right. What's one man's meat is another man's poison" is an old proverb, but it is not quite true. If you hurt one man you indirectly injure the whole community and *vice versa*.

Now, in the readjustments of things incidental to the tariff some people are temporarily hurt, but, like the toothache, it won't last forever. Some people are benefited at once and the good they receive will be imparted in good time, just as the dentist enjoys his fee and his patient presently forgets his pain. Now, a revival of business hurts nobody except temporarily, and it benefits everybody after more or less delay. Of course, people on fixed incomes feel it more inconvenient to pay \$20 for a coat that they have been buying for \$15, but comparatively few incomes are fixed, and if they wait a little the coats will come down to the old figure by the plain laws of competition. Importers of luxuries may suffer a little until their customers, who have been buttoning up their pockets for four years, begin to realize that they can make money and become more liberal. Our friends abroad may grumble because for the moment revenue imports check their exports, but let them wait till some of our people are doing well and they'll find we must have their things and don't much care what we have to pay for them. Meanwhile they often get our goods much cheaper than when, owing to the slackness of production and hard times here, we exported too little. We have been exporting too little, as a rule, ever since the Civil War. Well, that will cure itself. With good times here and good prices cheerfully paid for everything it will pay us to ship our manufactures at very low prices. This will not only tend to keep up our home prices, but put our best products at tempting rates before other people and stimulate them to do likewise to us.

The good old whipsaw principle is still the best in trade, but motion is necessary or the tool becomes rusty. Let us hope that the oil of reciprocal kindness may rub off the rust of hard times and that the intercourse of both exporters and importers in all lands may be polished up by diligence to an effulgence of international comfort and content.

The devil proverbially finds mischief for idle hands to do. There has always been plenty of money to capitalize work enough to let no honest, willing man or woman be idle, but lack of confidence has put it on the shelf. Now, with the break in the deadlock, every hand is being unloosed for the general good, and industry will have its innings and its winnings.

## AMERICAN TIN PLATE FOR EXPORT.

TEN years ago the manufacture of tin plate was an industry unknown in the United States. During the year ending June 30th, 1892, there were produced here 13,000,000 pounds of tin plate and 26,000,000 pounds of block plate. These figures gradually increased, until for the year ending June 30th, 1897, the product of these materials reached the respective amounts of 307,000,000 and 334,000,000 pounds, so that during the past year practically the whole of the American tin and tern plates were made from our own block plates.

The cost of imported tin plate in the United States seven years ago was \$4.80 per box. To-day American-made plate is selling in the domestic market for \$3.30 per box.

New methods have been introduced in the American industry that have done away with much hand labor, improved the quality, reduced the price, and at the same time raised the wages of intelligent workmen.

These improvements have brought the manufacturers to the point where export trade commences. American tin plate has already been shipped to England and to Italy, a fact that the dealers and consumers of these goods would do well to bear in mind.

## GOLD.

IT is doubtful if within the years covered by the life of any person now living there has ever been so many announcements of rich gold discoveries as have been made within the year from June 30, 1896, to June 30, 1897. This is true of the world; it is true of the Western Hemisphere; it is true of the United States alone. Discoveries have been announced the full meaning of which has not yet been measured. These discoveries, considered in connection with the cheapening of the cost of mining induced by improved machinery and methods of separating the gold from its accompanying dross and of securing it when separated, means much to the world's financial system. A grain of gold is in reality the world's unit of value, regardless of the legislation of any or of all countries.

Theories and discussions on this subject have held high interest for students of economic subjects and for practical business men in all countries through the years of the nineteenth century. But the dawn of the twentieth century brings with it no indication of a displacement of the grain of gold from its supreme preëminence as the unit of money accounting for the world.

For some years there has been comment as to the soundness of American securities. Foreign holders of these securities have at times become nervous about them and thought it prudent to return them in exchange for American gold.

The world, however, considered as a whole, is but one great mining camp. All people want gold and struggle for it wherever they chance to be or whatever they are doing. But gold is not the desideratum of all things. Food, clothing, shelter, implements, machinery, transportation facilities, etc., are wanted even more than gold. When they cannot be obtained for other consideration; when people have nothing else that the producers of these commodities will take, then, but not till then, will they part with their gold. The growing exports from the United States require payment in some form. Commodities are first offered, but the United States is an original source of supply for what may be termed the basic commodities of civilized life. For this reason payment cannot be made in this class of merchandise. As production in the United States increases in volume and diversity the opportunity for other countries to pay for its commodities with their own products decreases. When commodities cannot be used in payment securities or the money metals must be used. Securities of the United States will be returned because the United States creditor will prefer them to securities of other countries. They understand them better. When commodities are not wanted and American securities are not in hand then gold must come. This we do not require, as we have no



domestic use for it. It is only useful in foreign trade. When there are no foreign commodities to be bought with it and no American securities to be returned for it, it will be exchanged for foreign securities. Every other American product, every American security has at some time been regarded with suspicion and disfavor by all foreign buyers and investors, but American gold never. When foreign securities are exchanged for American gold the United States will enter the list of creditor nations. We can produce the commodities and the gold that will bring this inevitable result.

#### UNITED STATES OPPOSE UNIFICATION OF TIME AT SEA.

THE Royal Society of Canada, the Astronomical and Physical Society of Toronto and the Canadian Institute have been making endeavors to bring about a unification of time at sea. They invited the co-operation of the various chambers of commerce and scientific societies of the United States, and a scheme was drafted with the view of bringing about an apparently desirable change in the present system.

Superintendent Houghton, of the Maritime Exchange, took the matter up and laid it before the superintendent of the United States Naval Observatory at Washington. It did not meet the views of the department, and Mr. Harkness, professor of mathematics and astronomical director of the United States Navy, wrote in reply the following very comprehensive letter, which will be read with interest by the general maritime trade:

"DEAR SIR: Your letter of the 10th inst., addressed to Professor Newcomb, has been referred to me, and in reply I have to say that the scheme for unifying the standards of time at sea and on land has frequently been brought before this observatory in the past and we have uniformly opposed it for the following reasons:

"1. The scheme in question proposes the unification of the astronomical, nautical and civil days by making them all commence at midnight. This proposal was originally made by the Washington International Meridian Conference of 1894, and was subsequently very carefully considered by the official astronomers of the leading countries which publish astronomical ephemerides, but the general consensus of opinion was so far against the proposed change that no steps were taken to bring it about.

"2. The present practice of counting astronomical mean time from noon, or in other words, from the transit of the sun across the meridian, is in exact conformity with the practice of counting sidereal time from the transit of the vernal equinox across the meridian, and both systems have been adopted because of their superior convenience for astronomical purposes. The resulting advantages will not be less important in the future than in the past, and to make any change in either system would only introduce needless incongruity.

"3. The proposed abandonment of the astronomical day would necessarily involve the ephemerides in other systematic changes relating to sidereal and solar time, respecting which the advocates of the new reckoning make no suggestions, but which, we think, would be very difficult to effect without causing confusion.

"4. As the astronomical observation and ephemerides made prior to the year 1900 must continue to be used for many centuries, the proposed change would greatly complicate the work of astronomers by compelling the constant employment of two different systems of counting days, viz., one for all observations prior to 1900 and another for all observations subsequent to that date.

"5. All navigators are now accustomed to nautical almanacs in which the hours are reckoned from noon, and the introduction of new ones in which the reckoning was from midnight would be so confusing to them that it would probably cause many errors in the determinations of the positions of their ships.

"6. We believe the advocates of the proposed change are mistaken in supposing that it offers any advantages sufficient to compensate for all these inconveniences. The use of astronomical time is confined to astronomical work, and cannot possibly affect the people at large because they never have anything to do with it.

Why then make a change which will inflict permanent inconvenience upon those most concerned without benefit to others?

"7. In view of the above facts we are decidedly opposed to any change in the existing mode of reckoning astronomical time, and therefore recommend that no departure be made from the present system.

"8. Finally, I may add that this matter has been the subject of correspondence between the United States and other governments, and I believe that both the governments concerned and the authorities in charge of the great national ephemerides have all agreed that no change should be made in the existing modes of reckoning astronomical time."

#### THE HARVEST.

THE condition of the world's harvest has received such ample attention by the daily press all the world over that at this hour a résumé of the situation on the part of THE AMERICAN EXPORTER would be too late for practical service. Affairs in the grain market have not changed materially since it first became generally known that Europe was short of wheat and that the harvests of the United States and Canada were bountiful. At the time of writing the total yield of wheat is estimated at 463,000,000, as against an actual harvest of 428,000,000 last year, or an increase of 35,000,000 bushels.

Summing up the outlook in the world's wheat market, *Bradstreet's* of August 21st concludes that the United States and Canada will be called on for about 224,000,000 bushels, and the question naturally arises: Can the Dominion and the United States furnish such a quantity? Canada, according to the same authority, is slated for the 24,000,000, leaving 200,000,000 bushels to be supplied from this side of the line.

It is most likely that we will be able to meet this demand, so that except for the natural rise in price consequent to the general shortage there is little to be alarmed about. There need be no general fear, either, that there will be an abnormal value placed upon our grain exports. It has been clearly pointed out to our people that the moment prices reach a certain reasonable limit a further advance would check the demand and people abroad would seek and find substitutes for wheat in bread.

The moving of the harvest, especially under present conditions, has caused a very pleasant boom, which comes like a wave of refreshing relief to the years of comparative depression through which we have passed. Trade is wonderfully stimulated, confidence is restored, money is easier and the talk of prosperity is general. Unless there be many false prophets indeed, we are entering an era of good times that has seldom been equalled in the commercial history of the United States.

#### INDIAN CORN IN EUROPE.

FOR several years the American Department of Agriculture has been studiously engaged in finding ways to popularize the use of Indian corn for food in European countries. There is evidence that these efforts are being rewarded with success. In July, 1897, the shipments of this cereal exceeded 12,000,000 bushels, a gain of 60 per cent. over the shipments for July, 1896. During the seven months ending July 1, 1897, the shipments amounted to 116,000,000 bushels, against 64,000,000 bushels during the same period of 1896. It is true that these shipments may have been largely induced by the shortage of European grain crops, but it is also true that corn would not have been so readily accepted as a substitute for wheat if no preparatory work had been done to familiarize the people with its value and use as a food product.

The increased consumption of corn during the period of wheat shortage may be reasonably expected to make an important and permanent gain in the use of this grain. This may go so far as to perceptibly reduce the demand for wheat. It is expected that the United States will export 100,000,000 bushels of wheat in excess of last year and will also supply all the corn that Europe will take, although it is reported that 1,000,000 less acres were planted with corn this year than last.

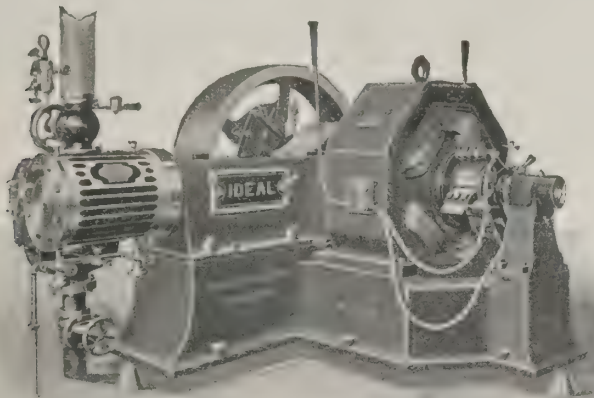


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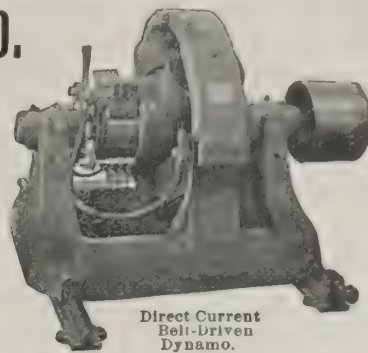
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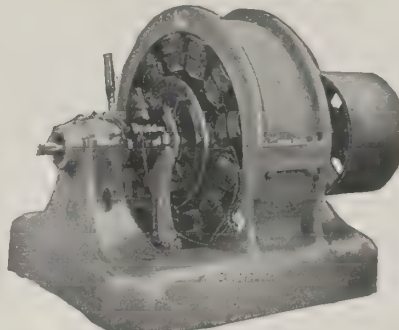
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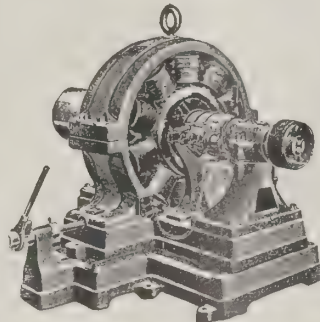


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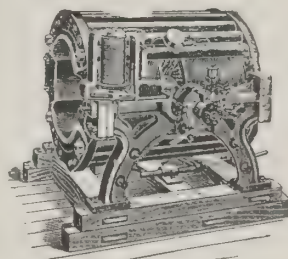
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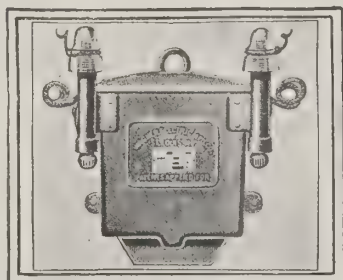
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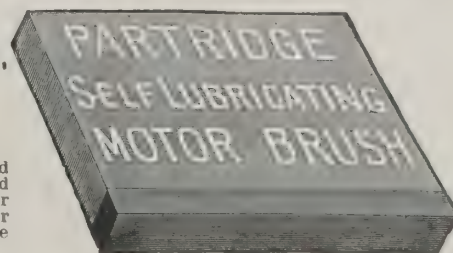
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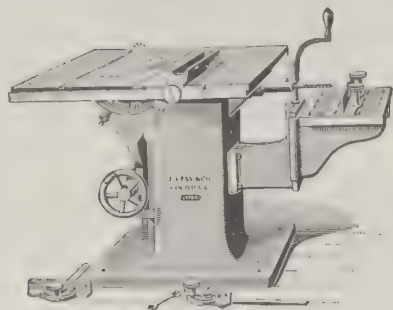
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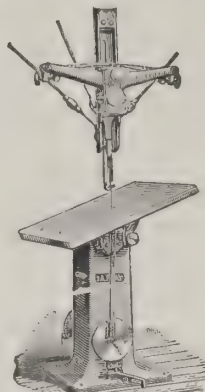
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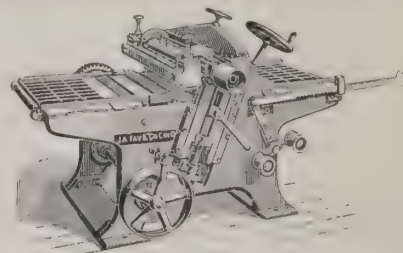
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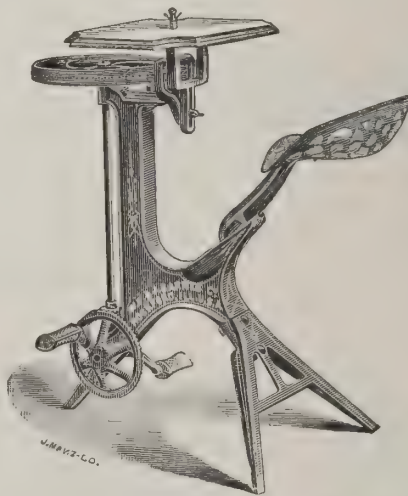
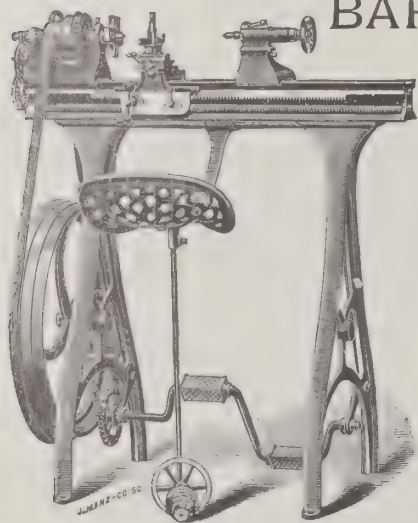
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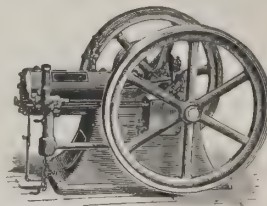
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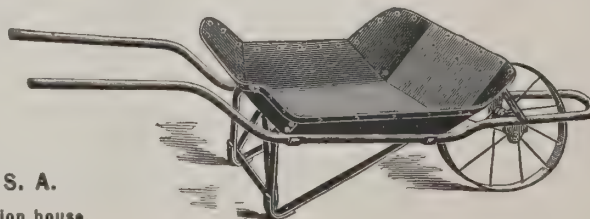
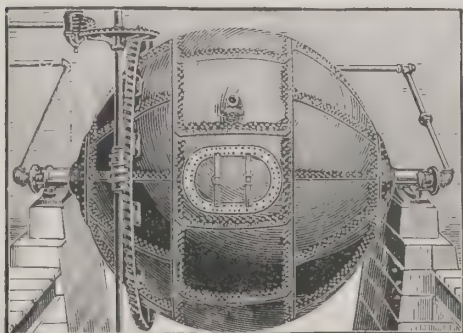
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Mr. F. P. Sheldon, of New York, recently compiled some statistics upon the cost of steam power under certain conditions, and the *Electrical Engineer* published the figures with an editorial note expressing grave doubts as to the correctness of the low figures arrived at. Mr. Sheldon defended his assertions and had little trouble in convincing the *Engineer* that his figures were in no sense borrowed in any mysterious manner, but were simply culled from accurate accounts the integrity of which is unimpeachable. He had not made them up with any intention of advertising them and he did not attach the same importance to them as did the exponent of electricity. On the other hand, he would consider amazing a compound steam engine plant of 1,000 horse power costing for fuel \$10.69 per year with coal at \$3 a ton for power alone for 3,080 hours. He has accounts from another mill, where coal is \$4.10 per ton, and the cost per horse power per year for fuel is \$9.10, and he believes the accounts are faithfully kept, as he is personally acquainted with the men who keep them.

Here is another case: A mill in New England, with coal at \$3.84, and all the fuel for heating the buildings in Winter (with over 150,000 square feet of floor space in them), besides steam for sizing yarn, cost per horse power per year for fuel \$9.69; and total cost in this mill, including labor, supplies, repairs and fixed charges (same as given in the other figures), \$17.89 per horse power per year of 3,080 hours. This with coal at \$3.84, and includes heating, which is no small item in this climate.

It will be seen that if coal at this mill were \$3 a ton the cost of fuel would be reduced to \$7.57 per horse power per year, including heating, etc., and the total cost to \$15.77 per horse power per year (3,080 hours in this case and a 1,200 horse-power plant).

Finally, no one of these is in any respect an exceptional steam plant. Mr. Sheldon states that a modern compound-engine plant of 1,000 horse power which, with coal at \$3, costs \$25.53 per year per horse power is sadly in need of overhauling. It is evident a good many persons are not posted on what is being done in New England textile mills without any great cry.

The lowest annual cost of steam power per horse power per year recently reported by Mr. Sheldon was \$11.64, and the fuel used cost \$1.76 a ton. The big engine in the Warren, R. I., mills, according to figures given out lately, makes a better showing, the cost being \$11.55, with coal costing \$2.26 a ton—5 cents more than at the plant previously referred to.

The Warren engine, a vertical cross compound, is of 1,950 horse power. The steam pressure is 155 pounds. The cost of power is shown by the actual daily records, and the fuel includes that used for furnishing steam for the slashers and for keeping up steam nights and Sundays. The price of coal delivered in the yard close to the boilers is \$2.26 per gross ton.

The following is a tabulated statement of the cost of power:

Fuel, per horse power per year of 3,070 hours .....	\$4.70
Labor.....	1.88
Supplies and repairs.....	.42
<b>Total operating expenses.....</b>	<b>\$7.00</b>
Interest at 5 per cent.....	\$2.05
Depreciation at 5 per cent.....	2.05
Taxes.....	.41
Insurance .....	.04
<b>Fixed charges.....</b>	<b>4.55</b>
<b>Total cost of power per year.....</b>	<b>\$11.55</b>

This is lower than anything yet found by Mr. Sheldon. It is due to the large size of plant, which reduces the labor and supply account per horse power, and to low cost of fuel and insurance and low cost of plant on account of its size.

The cost of plant includes a Green economizer chimney boiler house, engine house and foundations—all first class—water-tube boilers whose depreciation ought to be over  $2\frac{1}{2}$  per cent.

If steam used for other purposes than power were deducted it would reduce the fuel 10 per cent., or 47 cents per year, per horse power, making the to-

tal \$11.08. There is no way of separating this amount from the total in the regular accounts.

So far as Mr. Sheldon knows, this is the lowest cost of steam power in any New England textile mill. The tons fuel per horse power per year is 2.08—the lowest noted—others run about 2.20 tons per horse power and up.

### Corliss Engine Piston.

GEO. R. BABBITT, of Cranston, has recently patented a piston for Corliss engines which is rather of unique design. It has at the front and rear sides a peripheral flange extending partially or wholly around the piston and conforming to the bore of the cylinder, thereby increasing the face or thickness. The object is to provide the pistons of horizontal steam engines with an increased bearing area, thereby when in use distributing the weight over a greater surface of the cylinder as compared with pistons having substantially the same normal thickness and unprovided with the improvement, by means of which the lower or bearing side of the piston and the corresponding contact portion of the cylinder are subject to less wear than formerly, while the piston is working back and forth, owing to the area thus added to the piston's face, the added portion only slightly increasing the weight. Another advantage claimed is that the percentage of clearance is materially reduced, since the side flanges thus formed on the piston (when at the ends of the stroke) extend into the portway or recess formed in the cylinder heads.

The piston may consist of a single piece or casting, sometimes termed a solid piston, and provided with a circumferential packing ring, or it may consist of several members. As described by the inventor it is provided with a head to which a rod is secured, a removable follower and a centre or chuck ring, the latter being retained laterally between side flanges formed on the parts. The diameter of the chuck ring is, as a rule, slightly less than the bore of the cylinder and is capable of being adjusted vertically within fixed limits. The face of the ring has a peripheral groove, in which the usual packing ring is mounted. The two outer edges of the chuck ring are provided at the bottom with projecting side flanges or wings. These are coextensive with and form a continuation of the ring. The flanges extend around the head a distance substantially equal to the circumferential length of the exhaust port. The sides of the chuck ring may be extended at the top or upper portion, thus forming the side flanges substantially as stated with respect to the lower flanges. When the piston is at the end of its stroke the flanges may extend beyond the inner edges of the respective ports, at the same time leaving sufficient space or clearance between them and the corresponding portways formed in the back head.

As stated, the bearing surface of the piston is considerably increased, with a comparatively small percentage of additional weight. The adjacent surfaces of the piston and cylinder will be subjected to less wear, from the fact that the weight of the moving parts will be distributed over a greater area than in pistons unprovided with the improvement. At the same time, too, the added flanges reduce the percentage of clearance in the cylinder.

### America Leads.

"AMERICAN builders' hardware has just taken a fall out of the English article," says Orville Ewing, manager of a big New Orleans concern. "Some months ago an old Scotch captain dropped into my office and asked to see hinges, etc. He said he was building a house at Dunoon, Scotland, and that his wife had taken such a fancy to the American-made locks and hinges on his steamer that she wanted to take them off and put them in the new house. To save his ship the captain had promised to bring back the American article on his next trip, and he soon selected a quantity of building hardware of different kinds.

"That was last Fall; but a couple of days ago the captain made me a second visit and brought with him the plans of his handsome residence and selected hardware fittings for every part of the building from the parlor to the coal-house. He said that the articles he had previously carried with him were extravagantly admired by all who saw them, and that it was impossible to secure anything approaching them in style and finish in England. With that, the fittings in question were of the quality generally put into New Orleans houses erected at a cost of \$2,000 or \$3,000." The captain in question is Captain John Simpson of the steamer *Inch Marie*, now loading grain at the Stuyvesant Docks.



### New Electric Chain Coal Cutter.

THE electric three-phase system seems peculiarly suited for the cutting of coal by machinery. A new type of chain coal cutter has lately been perfected in the United States. The following is a description from the *Black Diamond*: It has a stationary frame and travelling carriage carrying the motor, driving gear, feed gearing and cutting chain. The motor is an induction motor, laid on its side. It has neither commutator brushes nor moving contacts, and, as it cannot spark, can be used in gaseous or dusty mines, where a spark might result in a costly disaster. The windings of the motor are stationary coils embedded in metal and protected from injury, and as these coils are separately formed and insulated, they may be readily removed and replaced. The motor is entirely closed and, no starting box being necessary, complete control is given by a simple inclosed switch. The motor stops work the moment it is overloaded, and the machine is thus subjected neither to strain nor breakage. The shaft of the motor is vertical and runs at a low speed, allowing the chain sprocket wheel to be driven by a single reduction spur gear, thus avoiding on the main drive both worn and bevel gears. The feed gearing is driven by a worm at the lower end of the armature shaft. The backward thrust of the feed gearing is taken by a single rack, so located as to compensate largely for the side thrust of the chain as it cuts the coal. Into this rack mesh two pinions, one for the forward and one for the backward motion of the carriage. The reverse lever at the back of the machine throws clutches in or out of these gears and is arranged to throw automatically when the end of the cutter travel is reached. A characteristic feature of this cutter is the small amount of gearing employed and the reduced number of wearing parts.

The chain is arranged to take three shapes of bits, each form cutting grooves about  $1\frac{1}{2}$  inches deep, separated from the next groove by a ridge of coal, which is broken down by the links. The cut is about 4 inches high by 36 inches wide, and the bits, made in the form of an arc of a circle, can be set out as required. This gives a great advantage in sharpening, as no part of the bit except the cutting edge needs redressing, and all of the steel may be used up.

The chain is built to stand the strain and vibration of the cutter. The bit links are of tough phosphor bronze, and the strap links are steel drop forgings of such shape as to bring all the strain directly upon the solid forgings and not on the rivets.

In rooms where the proper clearance can be obtained this coal cutter can be shifted, or moved from the first position ready for the second cut, in an average of 2 minutes, it being understood that the props are away from the face, the floor reasonably smooth and the face of the coal properly squared. The time of loading and moving the cutter from room to room will average about 15 minutes, provided the rooms are adjacent. The time required for setting the bits will average 10 minutes. The cutter has, in favorable coal, where other conditions were rather unfavorable, such as roof, props, track, etc., been able to average eight cuts or runs, each 36 inches wide, per hour, or at the rate of 240 lineal feet per 10-hour shift. The conditions can scarcely be so unfavorable that it will not always be able to average at least four runs per hour.

An approximate idea of the number of machines required for any particular mine can be obtained from the following formula, which gives the tonnage output:

$$(\text{Number of ft. face per 10-hour shift}) \times (\text{depth undercut}) \times (\text{height coal}), 27 \text{ cu. ft.} \\ = \text{Number of tons run of mine coal.}$$

To reduce this to lump coal the percentage of fine coal that passes through the screens from pick mining is ascertained. The percentage of lump from the machine will then be 25 per cent. greater than when produced by pick or hand labor. The amount of powder to shoot or break down the coal is also largely decreased. Any coal that would require, ordinarily, an 18-inch cartridge to break down, will require, when the same coal is properly undercut with the machines, an 8-inch cartridge for the same or a greater amount of coal.

Accompanying the cutter is the electric mining pump, which presents the great advantage of portability, which renders the electric pump superior for mine work to pumps driven by any other method. With an electric pump the pump shaft is free from all machinery. It contains only the conductors and discharge pipes. Indeed, the three-compartment shaft so common in mines, one for pumping and the other for hoisting, can by the use of the electric pump be reduced to two as the discharge pipes and wires, which occupy so little space, can be placed in one of the hoisting compartments. Furthermore, with an electric pump deleterious and often disastrous effects, inseparable from the use of steam, are absent. Moreover, the three-phase pump requires no attention beyond an occasional oiling, and needs no attendant to start or stop it. It can be operated by a switch from the engineer's office at the mine mouth.

### New Matchmaking Machine.

SOME time ago certain trade journals referred to a machine for making matches that was invented by Mr. Edward Lockwood, of Oswego, N. Y., who was then at work perfecting his idea. This machine is now completed, and said to be the most modern of all matchmaking machines. A technical description of the machine, however, is not at hand. It will make 180 cuts a minute, cutting 60 matches at each stroke, or 10,800 matches in one minute, or 6,480,000 matches in one day of ten hours, or 225 gross of boxes each containing 200 matches. The machine cuts the splints, dips them in the paraffine wax or sulphur and finally passes the finished match to the box-filling machine, which places the matches in a box with the cover upon each. The boxes are then dropped out ready for packing and shipment. It is estimated that the machine at 200 strokes per minute will produce 250 gross of boxes daily.

### Roller Bearings for Street Cars.

TWO years ago experiments with roller bearings were made by the Interstate Street Railway Company between Attleboro and Pawtucket. The result showed that a material saving in power was effected. Since then other roads have been testing the merits of the same device, and decided advantages are claimed for rolling motion in bearings which include deduction in starting effort, decreased tractive and revolving effort and economy in lubrication.

If these theoretical advantages are accepted as rising from the application of rolling motion to bearings, the practical question is: Can such bearings be constructed to withstand the shocks of present railway loads and speeds, as also the heavy stresses connected with modern tools and machinery, at reasonable cost?

The reduction in starting effort in roller as compared with ordinary bearings, which reduction reliable experiments have proved to amount to from 50 per cent. to as much as 83 per cent., is of such importance in all cases of mechanical, electrical or animal traction that if this were the only advantage it would warrant, other things being equal, the adoption of these bearings. In the case of steam or other mechanical traction, the reduction of starting effort allows of heavier trains or vehicles being controlled by the existing locomotives or other motors than can at present be dealt with. In railway vehicles the starting effort has been found in many cases to be as low as 3 pounds per ton of load. The following are the results of careful experiments made to ascertain the relative starting effort and running friction of tram cars fitted with ordinary and roller bearings:

Cars weighing  $4\frac{3}{4}$  tons, ordinary bearings, 198 pounds, or 41.68 pounds per ton; roller bearings, 30 pounds, or 6.53 pounds per ton.

A car fitted with ordinary bearings and weighing  $2\frac{3}{4}$  tons was let loose from a point 56 feet up an incline with 1 foot  $6\frac{1}{4}$  inches rise. It ran down this incline and 57 feet along the level line at the foot, or a total distance of 111 feet. The force expended was, therefore, 6160 pounds falling through 1,521 feet, or 9,364 foot pounds. The average frictional resistance was equal to 30.5 pounds per ton. A similar car fitted with roller bearings, being let loose from the same point, ran the full length of the level line available, 320 feet, and had not then quite come to rest, the total distance traversed being 376 feet. The force expended was as above, 9364 foot pounds. The average frictional resistance was about 9 pounds per ton of load. In the case of animal traction any reduction would not only be of great economical value by increasing the average life of the animals employed, but would also enable them to perform their duties with much less distress than under present conditions—a result much to be desired.

The following figures are founded on the results of actual experiments in tramway practice: Relative starting effort of a tram car on a gradient of 1 in 20—ordinary bearings, 100; roller bearings, 77; saving, 23 per cent. On a gradient of 1 in 80—ordinary bearings, 100; roller bearings, 50; saving, 50 per cent. On a gradient of 1 in 40—ordinary bearings, 100; roller bearings, 39.6; saving, 60.4 per cent. These results require no comment. As to decrease in tractive or revolving force, as the case may be, decrease in tractive force is of great consequence in railway, tramway and road vehicles, as it reduces the constant or "fixed charge" upon the locomotive, motor or animal; and similarly a reduction in the force necessary to revolve shafting and other machinery is of the greatest economical value, seeing that the amount of power expended in driving the main and counter shafts in workshops has been proved to amount to as much as from 50 to 80 per cent. of the total power employed. The reduction in the amount of lubrication required is purely an economical question. Experiments have, however, shown that at least 50 per cent. saving can be effected by roller bearings. With a perfect roller bearing no lubricant is required, but oil must be used to prevent rusting.

As to the possibility of realizing the theoretical advantages of roller bearings in practice, which is the question engineers have to consider, the results so far obtained are, to the knowledge of W. R. Marshall, M. Inst., C. E., so satisfactory that his conviction is that their adoption will be greatly increased in the immediate future.

These experiments in the United States serve to confirm the results achieved abroad, and show clearly that the experimental stage has been passed and that roller bearing have now developed into practical realities. In general application perhaps the most interesting is the fitting of roller bearings to "Great Paul," the big bell of St Paul's Cathedral, which with its headstock weighs 25 tons and which gave considerable trouble when mounted on ordinary bearings.

### A Guessing Match.

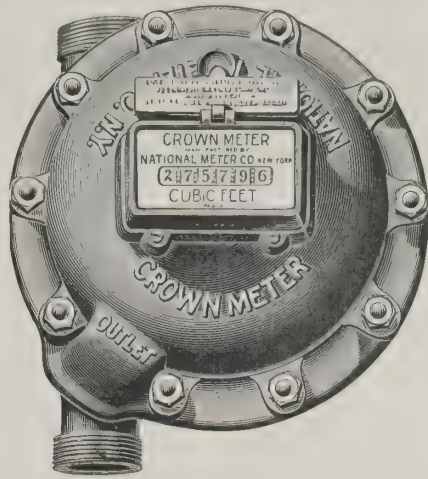
ON March 31st last the Thomson Meter Company, of Brooklyn, celebrated the event of stamping their water meter No. 50,000 by giving their workmen a dinner and entertaining them in a very novel way. They offered as a prize the sum of \$100 to the man who would guess the nearest date to the day upon which the company would sell meter No. 100,000. These guesses were put on a card with each man's address, placed in envelopes and stored in the company's safe. At noon on the 24th day of August, 1897, 3 years, 4 months and 24 days after, the workmen again gathered, and in their presence the meter 100,000 was stamped, the last of an order for 50 from the city of Providence, R. I. The company only number their meters as they are sold, and it made it a more difficult matter to decide the date than it would have been had the meters been made for stock.

Sixty-six men put in their guesses, and the winner, a man by the name of Corkhill, came within three days of the date with, the second but one day behind.



Interesting Information for Water Works Officials about

# WATER



# METERS

They measure correctly the amount of water passing through a pipe.

They increase the revenue,  
Restrict the waste,

and assist in maintaining a uniform pressure in the water main.



We have many letters of similar character, copies of which we would be pleased to mail you.

## NATIONAL METER CO.

118 CHAMBERS ST., NEW YORK.

The Largest Water Meter Manufacturers in the World.  
Over 183,000 in Service.

[SEPTEMBER, 1897]

City of Highland Park, Illinois.

NATIONAL METER CO.,  
298 Broadway, New York.

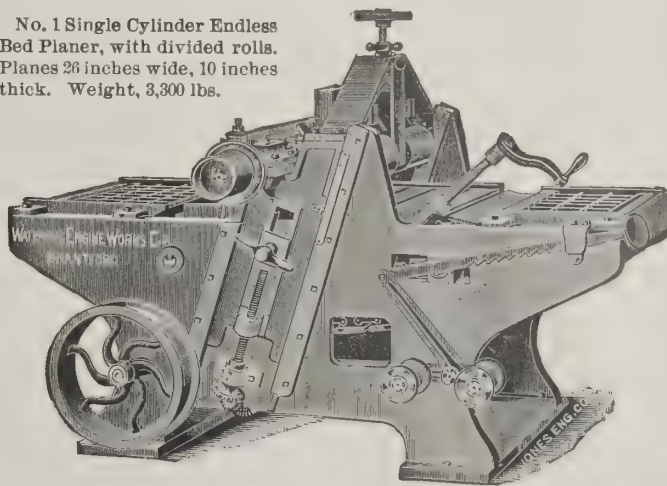
GENTLEMEN:

Replying to your favor of the 8d inst., would say that the city of Highland Park adopted the meter system in their water works in the winter of 1894-95. The result has been a material increase in revenue from the system, and a decrease in pumpage of at least 40 per cent. The water takers are well pleased with the service, as each pays for what he actually consumes. The city derives another advantage from the fact that leakage is quickly discovered, thereby increasing the economy of operating the system. Our experience has fully satisfied the most skeptical that meters soon pay for themselves in increased revenues on the one hand, and reduced cost of operating on the other.

Yours very truly,

J. C. CUSHMAN.  
Chairman of Water Committee.

No. 1 Single Cylinder Endless Bed Planer, with divided rolls. Planes 26 inches wide, 10 inches thick. Weight, 3,300 lbs.

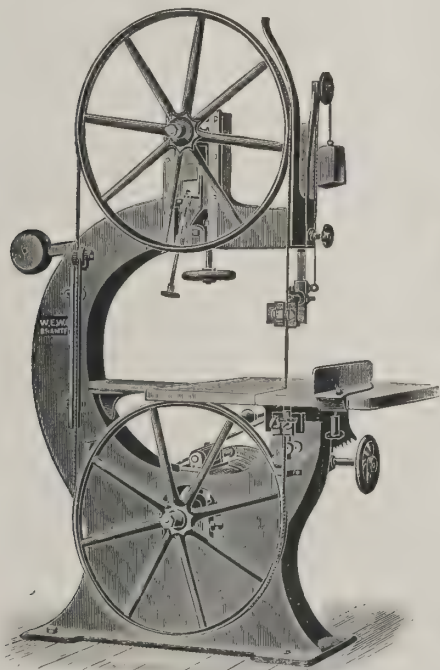


## Wood-Working MACHINERY.

No. 1 E. B. Planer. Weight, 3,300 lbs.; like cut.  
No. 1 Double Cylinder E. B. Planer. Weight, 5,300 lbs.  
No. 2 E. B. Planer. Weight, 2,600 lbs.  
"Champion" Combined Planer, Matcher and Moulder.  
Planes 24 inches wide up to 6 inches thick. Best all-around machine.

MANY OTHER STYLES AND SIZES,  
AND FULL LINE OF  
WOOD-WORKING MACHINES.

Long experience in the export trade is  
a satisfactory guarantee.



No. 3.—36-inch Wheel. Weight, 2,000 lbs.

## BAND RE-SAWS.

No. 5 Band Resaw.—48-inch wheels; saws 21 inches wide, 5 to 40 feet per minute. Resaw swings clear of machine when required. Weight, 4,500 lbs.

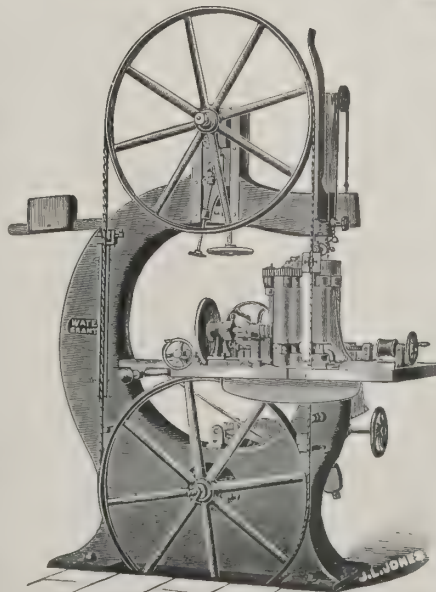
No. 6 Band Resaw.—48-inch wheels; takes saws to 3 inches; cuts 30 inches deep. Weight, 4,300 lbs.

No. 7 Band Resaw.—54-inch wheels; 4-inch saws; cuts 30 inches deep and to center of 10 inches. Weight, 5,300 lbs.

OTHER SIZES MANUFACTURED.

FULL LINE OF

Saw Mill Machinery.



No. 4.—40-inch Wheels and Removable Resaw. Weight 2,750 lbs.



1844.

NEW  
PREMISES.

1896.

January, 1896, we moved into new premises, securing unsurpassed facilities for executing contracts promptly and satisfactorily.

Order direct or through your commission house, sending us copy of order.

Saw Mill Machinery Our Specialty.

There are some 300 of our saw mills running in South and Central America, Europe, Asia and Africa, of different sizes, from those cutting logs 6 feet in diameter to small mills sufficiently portable for mule-back transport.

# WATEROUS, BRANTFORD, CANADA.



### Power Coal Drills.

**B**UT little attention has in the past been paid to the use of power drills in coal mines where electricity and compressed air are used for the motive power. The true value of drills of this kind was not appreciated until the zealous efforts of an American manufacturing concern forced them upon the market here, where they have been quickly and generally adopted as an indispensable part of a mining plant.

As machinery of this kind is subject to extremely rough usage, the design and construction of these drills are carried out with this point in view. A great many of each style of drill are being used in various localities under varying conditions, and the results obtained from them are encouraging for their general adoption by operators having power at their mines.

One style can be described as an electric drill with double post. The general design of this drill insures its ability to withstand heavy strains and severe usage. Its compactness, too, allows it to be handled rapidly and with ease, the complete weight being only about 150 pounds. The drill is made up of three parts—the motor, the frame and gears and feed.

The motor is of the multipolar type with ironclad armature. It is completely incased by the frame, and is fully protected from injury by accident. The terminals are so arranged that they are readily accessible, and contact can be made or broken without delay. The armature and field coils are thoroughly insulated and protected from ground or short circuits. All parts are readily accessible and removable, and can be reached without delay when necessary. The frame is made of rolled steel side bars firmly bolted to castings at top and bottom. The jack and jack pipe are at the top and are built to be adjustable within certain limits determined by the height of coal according to the special conditions existing in the mine where they are to be installed. These frames are built to suit any height of coal.

The motor and feed bars can be adjusted between the side bars in various positions according to the desired location of the hole to be drilled. The hole can be drilled at any height between the side bars, and can be drilled at any angle in a vertical plane from 0 degrees to 60 degrees in either direction from the horizontal; it can also be drilled at any angle in a horizontal plane from 0 degrees to 90 degrees in either direction from the vertical plane passing through the centre of the drill, and at right angles to the face of the coal. This arrangement allows the hole to be drilled in any position without resetting the drill. The shaft carrying the gear or master wheel has its bearing on top of the field frame. The shaft is hollow and carries two keys diametrically opposite each other.

The feed bar is  $5\frac{1}{2}$  feet in length, threaded its entire length, having 8 threads to 1 inch. On one end of this is a socket to receive the auger. This bar passes through the hollow shaft of the master wheel, and is splined in order to receive the two keys. The feed nut is arranged in front of the drill, and is supported by a pin. It is made up of two parts which are connected on one side by a hinge joint and on the other side, when in position about the bar, by means of a thumbscrew. The threaded part of the nut forms a liner for the clamps, and can be removed when worn without replacing the entire nut.

The nut is held in position by a collar about which passes a spring steel friction band, which can be adjusted to allow the nut to turn with the auger at any pressure desired. This insures a release of strain on the drill when the auger strikes any hard substance such as sulphur, hard slate or other foreign material. This automatic stoppage of the feed prolongs the life of the drill and allows the machine to work under a uniform strain. The auger is made of special steel and is of the usual type used for this class of work.

The general construction of the air-power drill is similar to that of the electric drill, and is applicable under the same conditions. The fundamental difference between the electric and compressed-air drills exists in the motor. On the latter the motor is of the rotary engine type, being extremely simple and of few parts.

The economy of drilling by means of power drills is sufficient to recommend them to the use of all operators. With either type of the above-described drills from 300 to 600 lineal feet per day of ten hours can be drilled. The drill can be operated by one man and a boy. To demonstrate what can be done under all possible conditions with these drills a number have been placed in various parts of the country so far with most gratifying results.

### An Ingenious Bolt Case.

**A** MANUFACTURING company of Chicago has introduced a new style of bolt case, unique in design, very convenient for the salesman or stock-keeper, and withal of reasonable cost. The case consists of pigeonholes that vary in size, with a tilting cover in front, which is held in place through a very ingenious device so that it drops closely down over the front of each pigeon-hole, giving it the appearance of a drawer. On this front is a brass card holder,  $1\frac{1}{2}$  inches long. When any certain size of bolt is desired the salesman has simply to take hold of the knob, raise the tilting cover and slide it back, similar to a curtain on a desk. This affords an opportunity of selecting the size desired without mixing the different sizes. It stands upright and the extra space that is naturally formed by this depth forms a storage space for extra stock of small bolts. It is built in two sections, the upper one being 15 inches deep from front to back, the lower one 26 inches deep from front to back, and in length 4, 6 and 8 feet, thus containing from 84 to 168 different sizes. It is handsomely finished in antique oak, and promises to be just what thousands of hardware merchants are looking for.

### Compressed Air Motors.

**T**HE attention, energy and capital that have been expended upon electricity and which have forced it to a leading place as motive power have, too, in a great measure prevented the advancement and consequent popularity of compressed air. Yet notwithstanding the lack of attention it has passed the experimental stage and is claiming at least a fair share of general favor. Under certain conditions it is unquestionably the most advantageous power, and we have pointed out the expressed opinions of practical men who have adopted it for many uses in the workshop with most gratifying results.

In some parts of Europe, and notably in Paris, compressed air is largely used as a propelling force for street railways. It is here supposed to have attained its greatest perfection, but we question greatly whether to-day there can anywhere be found a system more perfect in application and mechanical construction or one which gives more satisfactory results as to initial cost, convenience, power, speed and expense of operation than the American motors and methods of pneumatic traction.

The chief claims of American compressed air motors lie in the reheating of the air and the conveyance of it by the automatic regulating device to the air chest and in the mechanism of the engine. A very early cut off is used so as to lose none of the full force of the air. There is absolute protection, too, against leakage. Every joint is made adjustable, and as the slightest escape is at once audible the trouble can be remedied immediately.

Compressed air is used practically after the manner of steam and the air locomotive differs only in some slight details from the steam engine. The boiler, however, is replaced by large steel manifold or casing enclosing the steel tubes or bottles which contain the compressed air where it is stored at a pressure in each bottle of 2,400 pounds. It is drawn from these bottles by an automatic device which maintains a constant cylinder-working pressure of 150 pounds that can be raised to 200 at the will of the driver by a slight movement of the lever. This gives the motor a wonderful advantage in starting a heavy train. After leaving the regulating device the air passes into a vertical heater where water is maintained at a high temperature; there it is heated before entering the air chamber which corresponds with the steam chest of the locomotive.

It has been said that there is a certain element of danger in connection with the use of compressed air and that the pressure is so great as to endanger safety to a certain extent. There is really no foundation for this rumor. In fact there appears to be less danger than with steam. To prove how unfounded is this view one of the bottles or tubes used in street cars was tested to destruction by hydraulic pressure on the 10th of November last at the works of Messrs. Watson & Stillman, of New York.

The bottle was marked off into seven equal parts and the measurements taken without pressure beginning at the bottom were as follows:  $2' 5\frac{1}{8}"$ ,  $2' 5\frac{1}{8}"$ ,  $2' 5\frac{1}{8}"$ ,  $2' 5\frac{1}{8}"$ ,  $2' 5\frac{1}{8}"$ ,  $2' 5\frac{1}{8}"$ ,  $2' 5\frac{1}{8}"$  outside diameter respectively. Length,  $5' 6\frac{1}{2}"$  over all between perpendiculars. Under a pressure of 2,500 pounds the greatest expansion was a little over  $\frac{1}{8}"$ ; at 4,000 pounds,  $\frac{3}{8}"$ . When this pressure was removed the bottle returned to its original measurements. At 4,350 pounds the greatest expansion was  $\frac{1}{8}"$ ; at 4,550 pounds,  $\frac{7}{8}"$ , and the greatest permanent set noticed was  $\frac{3}{8}"$ .

At 5,000 pounds the length of the bottle had increased nearly  $\frac{1}{8}"$  and the expansion was  $\frac{7}{8}"$ ; at 5,280 pounds,  $\frac{5}{8}"$ ; at 5,730 pounds,  $\frac{1}{4}"$ . The bottle burst under a pressure of 5,760 pounds. The fracture, though, was very clear and not even a minute particle of the metal flew. The fracture extended from the neck a distance of  $2' \frac{3}{4}"$  down the side. When it is considered that these bottles are never charged beyond a pressure of 2,400 pounds their absolute safety is assured.

An air motor was put to a very successful test last month on the Manhattan Elevated Railroad of New York. It was run with a train of cars and about 200 passengers for a distance of about eight miles. It ran so evenly and speedily and performed its work so well that the judges were more than satisfied and no one could have told after the start that it was not the ordinary steam motor that had been in use.

A street car has been in actual service upon the streets of New York for more than a year with such good results that were it not for the immense expense of a change of plant its adoption would likely at once become general.

### Novelties in Steelmaking.

**S**EVERAL new processes having to do with steel and iron making have recently been tested. At Bellaire, O., a test was made of the John B. Hastings process of converting common iron into high-grade steel, which is reported to have been a "positive success." Five hundred pounds of iron were treated and converted at a total cost of less than 5 cents. The converter is heated by oil and air, requiring but 2 gallons of oil to obtain the required heat. This was pronounced by those present to be the cheapest and most successful process now known for making steel. There were also made lathe tools, test bars and other articles requiring high-grade steel. The lathe tools were placed in a lathe and put to cutting machine steel shafting. Other articles that were cast were reheated and made into different shapes, proving that steel cast in molds of sand could be made in any shape desired. Then the steel was heated, and it was found that it would stand as much heat as common iron, and a weld was made and all efforts to break the steel at the weld were unsuccessful. In Chicago a plant is being constructed to work a steel process in which it is proposed to make ingots from scrap or pig iron in a way and under methods which will cheapen the cost of steel by a third. In this process the furnaces can be kept at a temperature of 4,800° for twenty-four hours, if we may trust the claims of its inventors.—*The Hub*.





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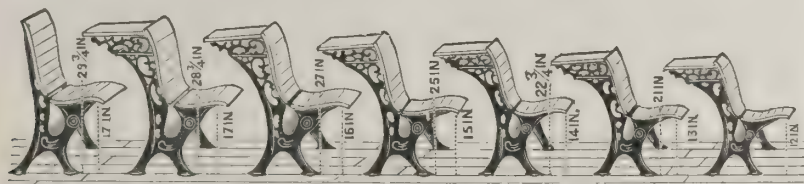
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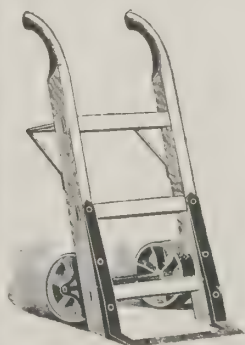
CHARLOTTE, MICH.,  
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Dear Sir:—We have used your colors for the last two years and we like them better than any we have ever used. Your Black, Wine and Greens are very fine colors, being very finely ground and having a good strong body. Your Ruby Red, we think, is the finest Red in the market, and full as nice as Carmine.

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### Giants of the Rail.

THE Southern Railway, which is the leading transportation company of the Southern United States and whose system taps every State in the Union south of Mason and Dixon's line with the exception of Texas, Arkansas and Louisiana, will next Fall place upon the rails three locomotives—the largest of their kind in the world. This might seem to some of our foreign friends like America trying to outdo the Americans, but the facts in crude state are these:

Each engine is fully twice as strong as the celebrated "No. 999" of the New York Central, which hauls between New York and Buffalo the fastest train in America—probably the fastest train in the world. They have individually nearly three times the strength of the engine which hauls the Flying Scotchman from London to Edinburgh, and would exceed this measure of comparison in a test with that speedy flyer which brings the mails from London to Holyhead. To express things differently and keep comparison within ourselves, one of these engines could haul as much as ten ordinary elevated railway engines, or four of the average passenger locomotives used in this country.

Together with extraordinary strength these engines have a remarkable capacity for high speed. On a stretch of level track one of them could pull at the rate of sixty miles an hour no less than 33 Pullman cars weighing 40 tons each. Such a train would be more than two-fifths of a mile long.

The six coupled driving wheels of each locomotive have a diameter of 6 feet, and the working steam pressure is 200 pounds to the square inch. There is nothing unusual about the cylinders. They are of the ordinary simple type, 21 inches in diameter, with a stroke of 28 inches. This gives a tractive force or drawbar pull of 27,460 pounds, sufficient to haul a trainload of 4,279 tons, equal to about the load of 85 laden freight cars, American type, at slow speed upon a level track. No locomotives now running have so large combined cylinder area and steam pressure as these new Goliaths.

The moving parts of a locomotive may be made as powerful as possible, but unless fire box and boiler are a match for the running gear the engine will soon be short of steam, and there must be an unmistakable slow down between stations. So long as coal lasts, however, this catastrophe is not likely to happen to one of these giants, for the fire box is 10 feet long with an ample width of  $3\frac{1}{2}$  feet, giving a total heating surface of 194 square feet, while the boiler is 5 feet 2 inches in diameter, with tubes giving a heating surface of no less than 2,298 square feet. Soft coal, of which about 8 tons will be put upon the tender at starting, will be the fuel.

An engine may also have another serious drawback. It may have great power and yet be unable to utilize it owing to an insufficient weight upon the driving wheels. One of these engines will weigh 75 tons—58 tons will rest upon the six driving wheels and the remaining 17 will be carried by the four-wheel truck in front. Reckoning the bite or grip on the rail at one-fourth the weight on the drivers we get an adhesion of  $14\frac{1}{2}$  tons, or 29,000 pounds, which is 1,540 pounds more than the tractive force of the engine, thus leaving a good margin for wet weather and slippery rails. The weight of  $19\frac{1}{3}$  tons on each pair of drivers is also unparalleled in the history of railroads. To carry this weight with safety and without heating, the journals of each axle are  $8\frac{1}{2}$  inches in diameter by 11 inches in length. Fancy locomotive journals 2 feet and  $1\frac{1}{2}$  inches in circumference!

The tenders attached to these engines will be worthy of them. Each will carry 4,500 gallons of water, and when loaded to its full capacity will weigh  $42\frac{1}{2}$  tons. This will bring the total weight of engine and tender to  $117\frac{1}{2}$  tons.

The object of having such powerful engines is not so much to make speed on the level as to maintain it on the grades. The maximum grades, of which there are several from 2 to 4 miles long, vary from 70 to 82 feet to the mile (roughly speaking from  $1\frac{1}{4}$  to  $1\frac{1}{2}$  per cent.) and the curves on these from 3 to 6 degrees.

### High-Speed Attachment for Drill Presses.

WE describe herewith a high speed attachment designed for use in any drill press. The device consists essentially of a box or casing containing four hardened steel gears, one of which is cut directly upon the end of the taper shank projecting through and above the box; another is cut midway in the length of the spindle carrying the drill chuck, the upper end of which spindle fits in the end of the taper shank; while the two remaining gears act merely as the back gears of a lathe, except that, in this case, they increase, instead of decreasing, the speed imparted to the driven gears. To use the attachment the taper shank is merely inserted in the spindle of a drill press like any ordinary drill, the machine started, and the spindle fed down as usual. For each revolution of the drill press spindle the attachment spindle makes something over two revolutions, giving, in even the largest presses, a suitable speed for drills down to  $\frac{1}{8}$  inch diameter.

As ordinarily designed the larger drill presses in common use are not adapted for drills less than about  $\frac{3}{8}$  inch diameter, to the manifest loss of time when drilling oil or other small holes. By the use of this attachment a heavy press is converted into a sensitive drill, and its productive power for light work thereby correspondingly increased.

For small work, which is held by the hand while drilling in an upright machine, the rod is screwed into the end of the handle of the attachment, and rests against the frame of the machine to keep the box from revolving with the spindle; but for large work, in which the weight is sufficient to prevent its being revolved by the drill, and it is not essential to have both hands free at all times, this rod is unnecessary, as a touch of the finger is sufficient to prevent rotation of the box.

### A Great Power Plant.

THE first installment of a large order for machinery has just been completed for shipment from St. Louis to Pittsburg, where it will form part of the most complete and largest modern rolling-mill plant in the world. The first engine of this order is a cross compound condensing rolling mill "St. Louis Corliss"; the high pressure cylinder is 32 inches in diameter, the low pressure cylinder 58 inches in diameter and the stroke is 60 inches. The engine is to run at eighty revolutions per minute, and, with steam at 125 lbs. initial pressure, will develop 2,000 horse-power at the most economical point of cut off. Double eccentrics are provided for each cylinder for operating the valves which control the admission of the steam to the cylinders, independently of the valves which control the exhaust. With the use of double eccentrics it is possible to obtain a range of cut off in each cylinder from a point at practically zero to nearly three-quarters of a stroke. At the most economical point of cut off the engine will develop 2,000 horse-power, and at the latest point of cut off the engine will develop 4,000 horse-power, and be under the perfect control of the governor all the time. The bed plates are of the heavy duty pattern, designed especially for rolling mill service, where the duty is unusually severe. The main shaft is 22 inches diameter and 23 feet long, and will weigh, with the two steel cranks and pins, 32,000 lbs. The wheel has a triple set of arms, is 24 feet diameter, 9 feet face, and has 48 grooves for manilla rope; wheel will weigh 150,000 lbs.; engine and wheel complete will weigh 380,000 lbs.

The engine is the largest ever built in St. Louis or west of the Mississippi River, and is the first of three engines, the other two being under construction, and the entire plant will develop 5,000 horse-power on normal working load. The condensers for these engines will be arranged as a central condensing plant near the river and will consist of three independent steam-driven jet condensers, built by the Indianapolis Steam Pump Company, and having steam cylinders 14 inches diameter by 24-inch stroke, and air cylinders 30 inches diameter by 24-inch stroke.

### American Engineers Abroad.

A SCRIPPS-McRAE telegram, under the headlines "Big Contract—Americans to Deepen the River Volga—An Outlay of \$3,000,000," makes known the following interesting information:

"Denver, Colo., July 28.—A cablegram was received here this morning from St. Petersburg stating that the Russian Government to-day signed a \$3,000,000 contract with Lindon W. Bates, an American engineer from Chicago, for the improvement and deepening of the Volga from St. Petersburg toward the Caspian Sea.

"Bates is the inventor of the great dredge which the United States uses on the lower Mississippi. He has already signed contracts with the Belgian Government for the improvement of river Scheldt, near Antwerp.

"The dredges for the Volga will be immediately constructed in this country, probably at Baltimore, under the direction of the Hon. W. W. Bates, who was President Harrison's Commissioner of Navigation, and who is the father of the successful American engineer."

While it is likely that the hull of the dredge will be constructed in Europe, as well as her steam machinery, the great pumps and electrical machinery can only be built in the United States. It is not improbable either that after American superintendents and crews shall have trained the Russian operatives the latter will carry on the deepening with the dredge, which will do the work of four or five ordinary hydraulic machines.

There are other dredging operations in the Old World involving far larger expenditures than are noted in the above dispatch which this same brilliant young engineer is likely to be called upon to undertake. Indeed, it is not too much to expect that his genius in hydraulics, especially applied to dredging work, might keep him constantly encircling the world, looking after the operations which his dredges and his contracts may, in a few years, find him engaged in.

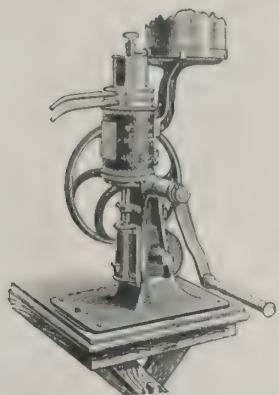
### Railways for Road Vehicles.

SOME discussion as to the adaptability and utility of steel rails upon country roads for use of ordinary vehicles has occupied the attention recently of some scientific journals in the United States. It appears the Government is now experimenting with a view of arriving at a satisfactory conclusion upon the subject. The *Engineering News* in its issue of July 15th, says:

"The steel country roads, with which the United States Department of Agriculture is now experimenting, will practically be constructed as follows: The present design calls for an inverted trough-shaped steel rail, with a slightly raised bead on the inside, and 8-inch tread and 7-16 inch thick. These rails would be bedded in gravel laid in well-drained trenches, and the rails would be tied together at the ends and at the middle. On grades the rails would be indented slightly to prevent the horses slipping on the rails; the joints would be made stronger than the rail to prevent 'low joints,' and to prevent the formation of ruts alongside the rails each joint would form a remount for the wheels. The advantage claimed for these steel roads is the reduction in traction from 40 pounds per ton on macadam to 8 pounds on the steel rails. The materials for the heavier class of steel roads of this design will cost about \$3,500 per mile in small quantities. The amount of material required is less than 100 tons per mile, and long lines could probably be built for \$2,000 per mile. The lighter type of road only requires 50 tons per mile, and would cost about \$1,000 per mile. These prices are exclusive of grading and track laying." It may be added that the bicyclist would find these rails the best cycle paths imaginable.



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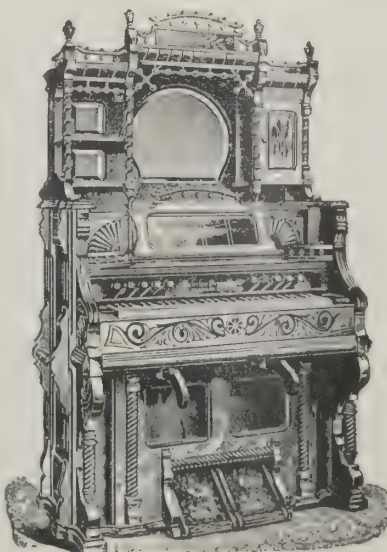
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### American Skyscraper for Japan.

W. J. BOND, an architect of considerable prominence, of South Dakota, has been awarded the work of constructing a typical American tall building, or skyscraper, in Tokio, near the residence of the present American Minister to Japan. In a land of seismic disturbances like Japan, where simoons, earthquakes and tornadoes are common occurrences at certain seasons of the year, it has never been thought practical to erect a tall building. The one or two story house of straw, of earth or of wood was considered the best architectural feat that could be accomplished.

Years ago, when the market for Japanese ware opened in the United States, an attempt was made by English capitalists to put up an office building which should be the centre of commerce. Scarcely had the foundation walls been set up, though, before a Japanese "shake" came, and it cracked from top to bottom, showing what would be the fate of a building put up on such a foundation.

This new building, to guard against that trouble, will have a structure of steel laid upon a solid stone foundation. This steel framework will be similar to the St. Paul Building in New York, and will be carried up to the full height of the building. The floors will be laid upon it, so that the entire support will be of the steel. All the latest accessories and conveniences will be found in place, steam engines, electric generators, steam boilers, electric wires, steam heat, pumps, drums, water supply and elevators. Inside it will have a terracotta finish, sanitary plumbing and mail chutes. The exterior will be that of any tall office building, but that its prominence will be most striking, standing as it will in the midst of so many low houses. This building will in fact be the first structure over three stories high ever yet erected in the Orient.

The top story of the new building will be occupied by the Japanese Weather Bureau, probably the finest in the world. For years it has forecasted storms so accurately that it has served as sole guide of the shipping ports of Japan. But the Bureau has worked under disadvantages. It has been obliged to take its observations from steeples, from the masts of steamers and from the kites of fishermen. At a certain height a kite will show an adverse current of wind, and the weather prophets of Japan have often been forced to this rude method of obtaining overhead information.

The steel skyscraper will go up fast, for the Japanese are busy bees when they get to work, and before the next chrysanthemum season there may be a very fine structure in the country of low huts and spreading flowers.

### Elevator Controller.

CHARLES O. LENZ and Charles H. Newhall, of Providence, R. I., have recently patented an electric appliance for controlling elevators by means of which the car is stopped the instant the door of the shaft is opened. Two contacts are connected with an electrical circuit, including the wires connecting with the battery or other source of electrical energy and with the magnet, located in a position to act on the lever of a supply valve between the main water supply and the elevator controlling valve.

The supply valve consists of a casing having the inlet chamber connected with the supply pipe and the outlet chamber connected by a pipe with the elevator controlling valve. The outlet chamber has an extension furnished with ports in which the valve is adapted to reciprocate, the valve being constructed to close the ports when raised and to open them when lowered. Secured to the valve is a valve stem, which extends down through a stuffing box and is pivotally connected at its lower end with the armature lever, this being pivoted at one end to a rod, which in turn is pivoted to a stud extending from the stuffing-box frame. When in the released position the lever is supported by the arm through a slot in the lower end of which the lever works.

When the contacts are brought together by the opening of the door the magnet is energized by the current passing through the completed circuit and the armature end of the lever is drawn upward, the valve being at the same time pushed upward by the valve stem, thus closing the passage for the water or steam to the elevator controlling valve and preventing the operation of the elevator. When, however, the circuit is broken by the closing of the door the lever drops away from the magnet, the valve is opened, and the steam or water passes through the valve ports to the controlling valve.

### Lord Kelvin's Views.

ON August 25th last a banquet was given to the visiting members of the British Association at Toronto, at which, too, were present a goodly number of scientists from the United States.

In the course of his speech in reply to the toast of "Our Guests," Lord Kelvin, who requires no further introduction, said that taking a purely selfish view he thought they in England must look very carefully to their brethren on this side of the Atlantic, by which title he meant their fellow subjects and their brethren from the United States of America. They now looked westward for a great deal in electric engineering. Inventiveness in Canada and the United States had helped them greatly in England, but not merely inventiveness, but the practical quality by which they were able to manufacture and bring to a rare state of perfection the machines they had designed. This was something that England had not yet succeeded so well in doing. He could not say that in all respects the Canadian race, nor the people of the United States, were an improvement on Old England, but he did say that they found advanced qualities in Canada and the United States of mental development that they had not yet reached in the Old Country, but that would be an example to them.

### Dr. Peate's Great Mirror.

ON the 1st of April, 1895, the Rev. Dr. John Peate, who is known generally as a skillful amateur clergyman, undertook the construction of the mammoth speculum for the great reflecting telescope of the American University at Washington. Now after two years of arduous and absorbing toil Dr. Peate announces that he has given the finishing touches in grinding and polishing to probably the second largest mirror of its kind in the world.

The Philadelphia *Public Ledger* gives the following interesting description of the work:

"In a shop attached to his residence at Greenville, containing three rooms and a testing gallery, Dr. Peate has spent two years of continuous effort to properly figure a huge disk of glass more than 61 inches in diameter and several inches in thickness. The grinding tool had a convexity of nine-sixteenths of an inch and 500 facets, half an inch apart, no two of them being at the same distance from the centre. The power employed was a gas engine, and emery of various grades of elutriation was used with the tool.

"The great speculum reposed while being ground upon a revolving table 63 inches in diameter, and was supported by a hinged frame, which permitted the mirror to be raised on edge for the purpose of the "shadow test." In the testing gallery, some 60 feet long, without doors or windows, a lamp was employed, around which was placed a metal shield or screen with a minute hole in it, the rays of light proceeding from it forming an artificial star, and the cutting off of which with a knife blade served to determine the correctness of the figure of the mirror. The test is a most delicate one, for the slightest change in the temperature will affect the mirror; but when a speculum has successfully passed the shadow test under favorable conditions of atmosphere no fear need be entertained of its performance on the heavenly bodies.

"The patience involved in hundreds of these tests is inconceivable. In the case of the great Yerkes lens, Mr. Alvan G. Clark assured the writer that, in addition to the innumerable shop tests, he had mounted that weighty and precious piece of crystal in its temporary tube no fewer than seventy times!

"Dr. Peate has not yet attempted to silver his prodigy. But unadorned in its beautiful and shining metallic dress, it has, nevertheless, an incredible light-gathering power. The Doctor writes: 'I can see a common pin and one of my own gray hairs tied on it more than 1,000 feet from the mirror across the fields.'

"The reflection of the moon at the focal point would be absolutely blinding.

"When the intricate and costly mounting is ready for the speculum it will probably be used in the Newfoundland style, *i. e.*, it will rest upon an adjustable bed at the bottom of the giant tube, and the rays of light falling upon it will be reflected to the sky end of the tube, in the centre of which a plain mirror, placed at angle of 45 degrees, will elbow them out at the side of the tube for magnification by an eye piece. The observer, of course, will be high in the air.

### Automatic Telephone Service.

IT would seem that the day of the telephone girl is passing and the familiar phrase "Hello! Central," is likely to become a legend of the past. Some time ago a complete automatic device was tried at Augusta, Ga., with such gratifying results that a similar exchange has been opened at Amsterdam, N. Y. The great commercial value of this change in the method of telephony is too apparent to call for comment, and a little time now is only required to demonstrate the entire success of the experiment, which already seems to be well within the bounds of practicability and will be watched with keen interest all the world over.

A novel feature in connection with the new telephone exchange at Amsterdam is the use of bimetallic wire. The reports of results are very satisfactory and seem to open up an opportunity for doing away with iron wire in telephonic work.

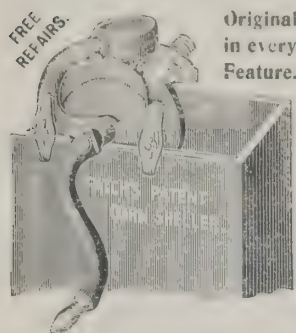
It would be an arduous task to sum up all the damage brought about by the use of the fragile iron wire still in such general use, and the rapid extension of telephone service to-day must naturally tend to bring with it an increased number of accidents and fatalities unless a change like the one referred to is made to something which will prove a stronger conductor and yet be better able to withstand the strains and resist the effects of time and weather.

It would seem that telephone managers are becoming thoroughly alive to the great risks they run when using brittle wire in the construction of aerial circuits, so we are likely to see fewer casualties due to broken wires and crossed trolley, lighting and telephone circuits.

### Riveting by Compressed Air.

IN regard to riveting with compressed air, the master mechanic of the Santa Fé road is quoted as saying that by the use in the Santa Fé shops of a stationary riveting machine three men are enabled to drive 2,000 rivets per day of ten hours at a cost of \$4.75, as compared with 200 rivets per day at a cost of \$7 by hand labor; the truck riveters—the machine being operated by two laborers at a total cost of \$3 per day—drive 3,000 rivets, as compared with 175 rivets driven by hand labor by three men in a day at a cost of \$6, while the staybolt breaker makes an average saving of \$8 a day and the tank riveter an average daily saving of \$10. Further, the mud-ring riveters will drive as many rivets as can be handed to them and will make a saving of \$12 to \$15 a day for that class of work. Not only is this method credited with the great saving named, but is declared to insure every rivet hole being filled entirely and insures tight work, while of hand-driven rivets in mud rings a large percentage invariably leak.





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MADE ONLY BY THE PATENTEE,

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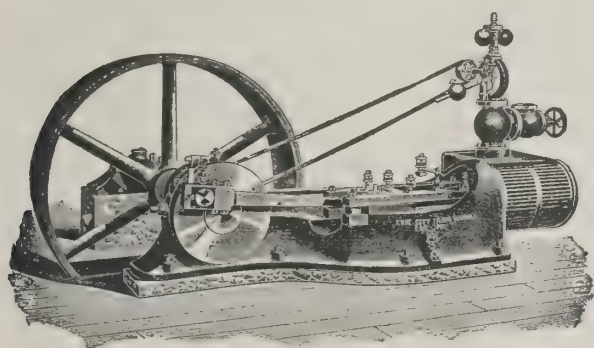
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Represented in more than 200 cities in the United States.

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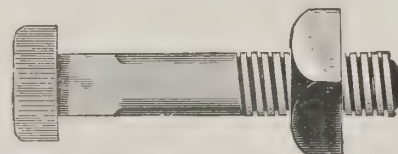
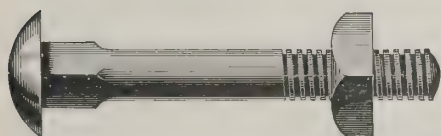
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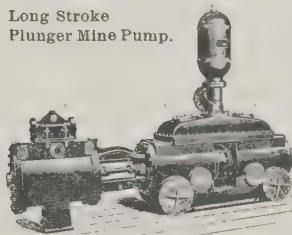
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Pumps for Every Service.

MINERS' SINKING PUMPS A SPECIALTY.  
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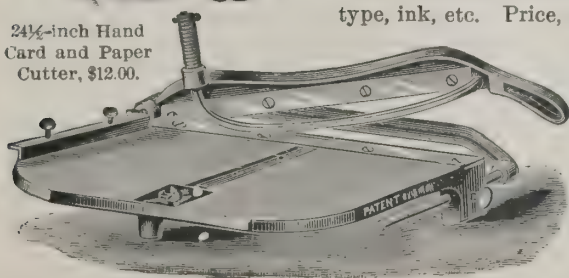
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2 1/2-inch Hand  
Card and Paper  
Cutter, \$12.00.



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EVERY MAN MAY PRINT HIS OWN CARDS, CIRCULARS, ETC.

SMALL HAND PRESSES, simply arranged with type for any language, by which any person can do good printing. Typesetting perfectly easy, to even a boy, with our printed instructions sent with every press.

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No. XX Press prints cards, circulars, etc., up to 5x8 inches. Complete with 7 styles type, ink, etc. Price, \$40.00. This outfit is entirely complete, ready for use.

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Please write for our Illustrated Catalogue, by mail, of Presses, Type, Paper, Cards, etc., direct to our factory, near New York.

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A larger machine for fast work. Speed nearly 2,000 per hour. Chase, 9x13 inches Weight, boxed, about 700 lbs. Price, only \$100.00. Price, \$200.00, if complete with type, ink, and all fixtures for general printing.



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PLOWS, HARROWS, CULTIVATORS, PLANTERS, RAKES, BEET MACHINERY, Etc.



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All kinds, all sizes.



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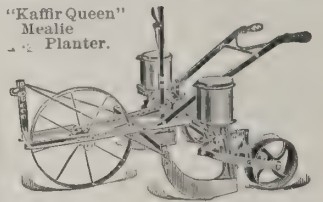


GOOD-ENOUGH  
SLAVE PLOW.

Any Size  
Bottom on  
same Frame.



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F. O. B. New York. Special Attention paid to the Requirements of Foreign Countries.

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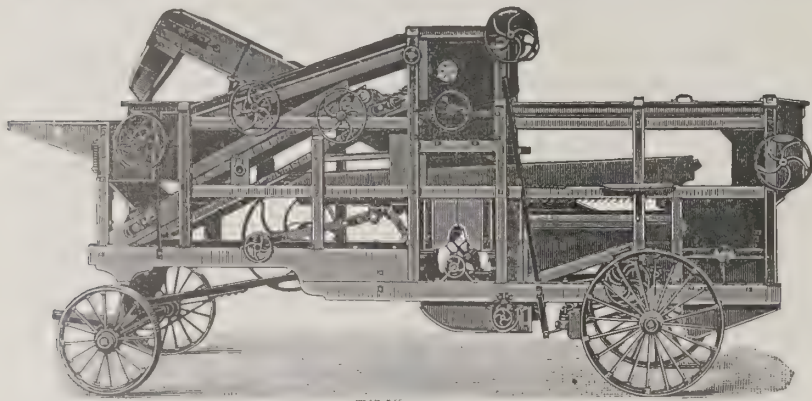
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Send for New Catalogue, either Spanish or American; also New Telegraph Code.

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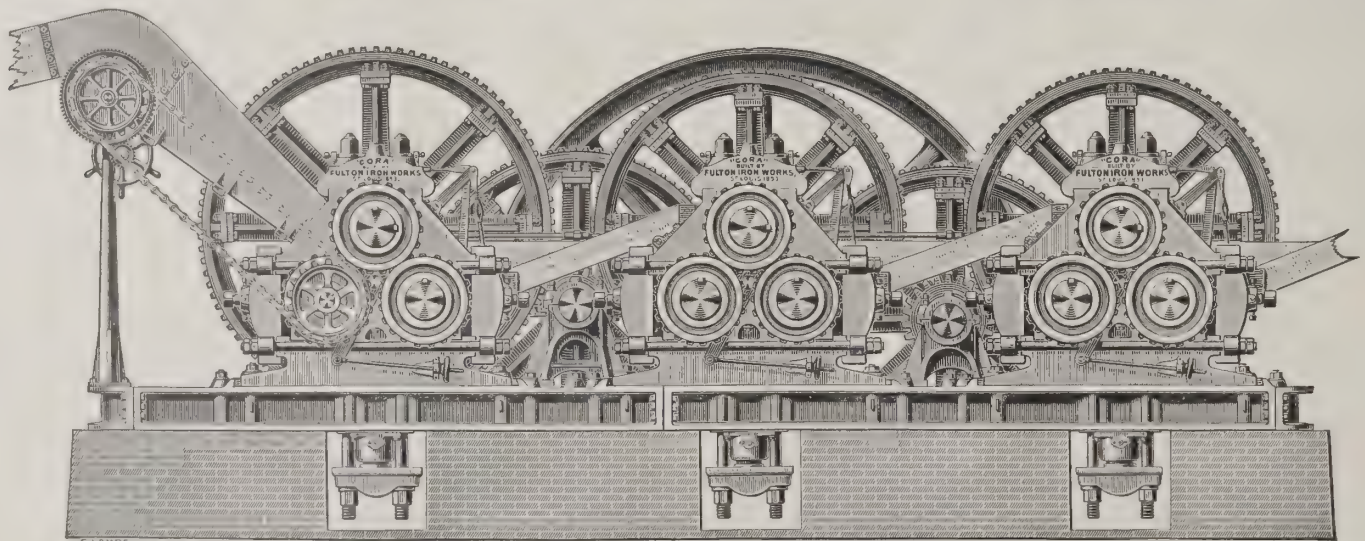
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## "CORA" Nine-Roller Cane Mill.

CORRESPONDENCE SOLICITED.



ESTIMATES FURNISHED.

Built by "FULTON IRON WORKS," St. Louis, Mo., U. S. A.

Per S.S. "COPTIC"

FULTON IRON WORKS, St. Louis, Mo.

HONOLULU, H. I., June 17th, 1895.

Dear Sirs: The nine-roller mill and Corliss engine built and erected for us by you last year has given perfect satisfaction, and we take pleasure in furnishing you with the following report covering work performed by it during the season just closed. Days grinding, 104 $\frac{3}{4}$ ; Tons of cane ground, 61,617.928; Tons of cane ground per day, 588.238. Extraction: 92.49 per cent. total sugar; 82.13 per cent. of cane; Dilution, 7.91 per cent.; Fibre in cane, 11.02 per cent. Average load on hydraulics, 313.2, 334, 344.5 tons.

It is hard to say just what is the capacity of this mill, as our boiling house is not of sufficient size to admit of a prolonged test, but we would say that we have ground on a short run over 50 tons of cane per hour, and with an increase of from 50 to 75 tons in the load on the hydraulic obtained an equally good extraction. We believe we have the best mill on the Islands.

Very truly yours,

EWA PLANTATION CO.,

E. D. TENNEY, Secretary.





DEVOTED TO THE FOREIGN TRADE IN AGRICULTURAL MACHINERY AND IMPLEMENTS

### American Fruits.

WITH the assurance of a great wheat and corn crop comes, too, the gratifying news that we are to have an abundant supply of Fall fruits, including largely those that are exportable.

Reports have reached us from the fruit-growing States of the Pacific Coast, from the Mississippi Valley and from the Northeast that there is an unusually large product of plums, pears and peaches, as well as of small fruits and berries. In the State of New York, along the valley of the Hudson and elsewhere, the buyers and packers of pears and apples are unusually busy; some individual firms are known to handle as many as 500 barrels a day. New Jersey, which is famous for its peaches, reports that the season is at its height and that the crop will exceed that of any previous year, reaching, it is estimated, nearly 4,000,000 baskets. Prices, too, are at that happy medium—they afford a fair profit to the raisers and are reasonably low to buyers.

Good apples in the home market command from \$1 to \$1 25 per barrel, pears from \$1 to \$1.50, and the best Jersey peaches bring from 40 to 60 cents a basket. In some cases the agents of the large dealers secure the product of a whole county, or of several counties, and that upon terms which are satisfactory to all parties. Fruit exchanges have been found useful in steadying prices and in securing the best varieties of fruits for the market.

A good foreign trade is looked for in peaches and pears, although they are not quite so well fitted for export as the hardy apples, an unusually large quantity of which is already booked for foreign markets.

England has been the chief foreign market for American apples; but last year Germany bought a good many hundred barrels of them, though German apple growers found fault with them, declared that they were inferior to the native product and sought to exclude them. It is possible that the Germans will yet gain experience through which they may be able to appreciate the superior qualities of the choicer kinds of American apples, which are lovely to behold, very juicy and possessed of just the proper measure of sweetness and of acidity.

About three years ago California fruit growers began to make efforts to introduce into European markets the most excellent and renowned fruits of the Pacific Coast, not only apples, oranges and pears, but apricots, plums and some kinds of berries.

The chief obstacle to the success of this particular trade is, of course, the great distance that the fruits have to be transported. In some cases they were sent from the Pacific Coast to New York by rail for shipment across the Atlantic; in other cases they were conveyed to England in vessels sailing from California ports. Whether brought overland to this place or shipped by the all-sea route, they frequently suffered damage during the weeks of conveyance and reached the English market in bad condition. Consequently California fresh fruits have not gained as high a reputation abroad as they are certainly entitled to at home. Improvements, however, in the mode of package, cold storage and refrigerator cars have done much toward mitigating the risks of long carriage, and it is hoped that the delicate flavor of these fruits so favored by foreigners in the canned state will create a profitable demand.

The annual production of cereals and of fruits here is better assured than in any other country. This year our product of grain and of those kinds of fruits most desired abroad is so abundant that we are able to supply the whole of Europe with all needed supplies and to sell them at exceptionally low, yet fairly profitable, prices.

### The Wagon Trade.

AMERICAN manufacturers of farm wagons have every reason to feel elated over the outlook for the Fall trade. Business with them has not been so brisk for many years. Sizing up the prospects upon the basis of previous years many of them have been caught napping, and are unprepared for the rush that has come upon them. The export trade has been exceptionally good, and the abundant harvest at home has this season turned the quiet trade of some years past into one of unprecedented activity. As an example one jobber claims to have sent out nearly four hundred wagons on contract orders up to August 10th, and as his operations are confined to a small territory this is something remarkable. Like the bicycle, the American farm wagon is a leader of its kind. You will find it on all large farms of agricultural countries. Its combination of lightness, strength and carrying capacity together with its easy, smooth-running qualities are simply unrivalled.

### New Hay Presses.

A MANUFACTURING company at Sandwich, Ill., has recently brought out a horse-power hay press in two styles which possesses features likely to recommend it to dealers looking for improved designs.

It is claimed for this press that it is simple, durable and economical in point of help and power required; easy and safe to feed; portable and quickly set for work; the connections between press and power are such that the machine may be set for work at bank barns. It has positive automatic plunger draw—no spring used—low bridge, gong indicator, steel lining, chaff grate, large feed opening (no foot feeding required), and a four-foot stroke. The press stands up on its wheels, and the tier may stand up to his work, not being obliged to get down on his knees in the dust, mud and snow. It is light of draft, puts full weight into the ordinary box-car, and has an actual capacity of from 12 to 16 tons per day. The second style is one of similar design, but made of steel. It is a regular full circle all steel press and is called the American.

### The World's Greatest Pump.

A CORRESPONDENT of the *Chicago Record* in writing of the great Calumet and Hecla copper mines describes one of the pumps in use at the mills. If his details and figures are even approximately correct, this piece of pumping machinery is undoubtedly the greatest piece of mechanism of its kind in the world. Without being forced to its limit it delivers some two and one-half million gallons of water every hour of the twenty-four.

The apparatus is a triple expansion pumping engine with a capacity of sixty million gallons, standing nearly fifty feet in height, and requiring fifteen hundred horse-power for its operation; and it has been proved by actual tests that its nominal performance can be easily maintained for an indefinite time without injury or strain, and that, pushed to the full extent, the pump could handle approximately seventy-five million gallons in twenty four consecutive hours. The purpose of this pump is to furnish water for the great stamp mills of the Calumet and Hecla Company, which has twenty-two steam pumps in continuous operation, daily pulverizing 5,000 tons of conglomerate rock into sand so fine that it can be carried away by a stream of swiftly running water. The pump is located near the lake shore and below the mills, so as to force a steady stream of water to the upper portions of the mill, where innumerable small jets play upon the great slime tables and jigs. Here it is that the specific gravity of the fine particles of copper contained in the rock separate the valuable mineral from the mass of worthless sand, the size and force of the streams of water being so nicely regulated as to wash away the sand and yet carry with it the minimum of copper.

### California Fruit.

THE popularity of California and other American fruits abroad is rapidly resulting in increased demand. Ninety-five carloads were shipped recently from Sacramento. The fruit going to the East now consists mainly of pears, peaches and plums. A few weeks ago two carloads from Sacramento and two from San Jose were consigned to London. The demand in England for California fruit is constantly growing. The fruit has reached London this season in good condition. The recent shipments were made by the Central & Union Pacific, the Chicago, Milwaukee & St. Paul, the Erie Dispatch and the American line of steamships.

### World's Largest Fountain.

AT Indianapolis August 3d last the greatest fountain in the world was turned on and permitted to flow for an hour. It is one of the cascades now in course of construction at the base of the soldier's monument. The flow of water measures fully up to the contract, which calls for 7,000 gallons a minute at each of the two cascades as a regular thing, with a capacity under high pressure, however, that is much greater. The combined capacity of the world's famous fountains at Versailles, hitherto the largest in the world, is 80,000 gallons an hour. They would make but feeble streams in comparison with the monument cascades, and yet the cost of running the French fountains is so great that the water is only turned on on gala days.



### Pearls Extraordinary.

IN Western Arkansas an extraordinary find of pearls has been reported, and to a great extent the report has been confirmed. The pearls are found in the shells of certain shell fish which abound in two small lakes known as the Miller and Murphy lakes, not far from Bald Knob, on the Iron Mountain Railroad, and about 100 miles west of Memphis, Tenn.

The story of the discovery is interesting. A young man named Furlough went down to the lakes from St. Louis to fish. He had handled pearls before, and on opening one of the bivalves discovered a stone and was at once struck by its appearance. He sent it to an expert at St. Louis and awaited the verdict. The positive assurance came back that the stone was a genuine pearl and of excellent quality. Furlough at once deserted his piscatorial employment and devoted himself entirely to accumulating a stock of the gems. When his money ran short he sent a few of the smaller specimens to the Byrd jewelry house in Memphis, and by return mail received the regular market price for such stones. Soon other persons from the same neighborhood began to consign similar stones to the Byrd establishment. The Memphis people began to make inquiries, and it was not long before employees of the jewelry house began to throw up their positions and to make mysterious journeys over into the swamp country. They gave out that they were going fishing; and so by degrees it became generally known that the Arkansas lakes were yielding fortunes in precious stones for all who would go after them.

Mr. J. J. Williams, County Trustee of Shelby County, went over to the scene of the discoveries some weeks ago. He spent three days there, and during that time picked up forty-two pearls from the surface mud, ranging in size from a pea to a large acorn. He then concluded a deal with the owners of the property by which he secured an exclusive lease of the two lakes for a period of five years. Before leaving he engaged a force of deputy sheriffs to guard both lakes day and night, and lights were erected all around the lakes, so that they could not be approached by depredators at night without being seen. On his return to this city Mr. Williams purchased a dredge boat and had it shipped over by rail in sections. It is now being put together on the shore of Murphy Lake, and as soon as it is in shape the work of dredging the lake will be taken up in earnest.

The mussels from which the pearls are developed abound in all the Arkansas bayous. Many persons eat them, but the meat is too soft and flabby to be favored by the epicure. Under certain conditions a small grit forms on the surface of the meat inside the shell, and this gradually becomes a sort of cancerous growth. It expands and hardens, and as it grows it absorbs the meat of the mussel, till at last none of this animal substance is left, but in its stead is a pearl more or less perfect. If the shell remains undisturbed it will contain the pearl when it is picked up, but if there has been a current in the water that has disturbed the shells the pearls may be scattered over a wide territory. The alluvium of the Arkansas lakes and bayous is not deep, and therefore the work of dredging and sifting is not a serious undertaking.

### Gold Production of the World.

MR. PRESTON, the Director of the United States Mint, estimates the gold production of the world for 1896 to have been \$205,000,000, of which the United States contributed over \$53,000,000. For 1897, it is believed, the world's gold product will reach at least \$240,000,000, an increase of \$35,000,000 over 1896. As an indication of the increase in the world's probable gold output for 1897 Mr. Preston gives the following table:

	1896.	1897.
United States .....	\$53,000,000	\$60,000,000
Australia .....	46,250,000	52,550,000
South Africa .....	44,000,000	56,000,000
Russia .....	22,000,000	25,000,000
Mexico .....	7,000,000	9,000,000
British India .....	5,800,000	7,000,000
Canada .....	2,800,000	10,000,000
Totals .....	\$180,850,000	\$219,550,000

"That the world's great product will continue to increase for a number of years to come," says Mr. Preston, "is self-evident, as new mines will be opened up, and with the use of improved appliances and methods for extracting the gold contained in the ores it is believed that by the close of the present century the world's gold product will exceed \$300,000,000."

### Furniture to Prevent Seasickness.

A FURNITURE supply company of New York is about to earn the lifelong gratitude of many an ocean voyager by introducing suits of furniture which, if capable of doing all that is claimed for them, will prove a most effective preventive of seasickness, and a voyage across the Atlantic, even when the wind is blowing a hurricane and the seas are running mountain high, will be as monotonous as if the sea were of glass and the steamer slipping along on pneumatic-tired rollers with greased axles.

The purpose of the company is to supply all steamers, and sailing vessels, too, with furniture, such as tables, chairs, berths, etc., that will maintain a level no matter how much the ship rolls. The inventions are all complete and the inventor, Dr. Emmens, says that former Commodore Smith, of the New York Yacht Club, and the International Navigation Company have approved his models and will try the furniture on their vessels as soon as possible. It is understood that the company does not offer the furniture for sale, but simply rents it after the manner of the Pullman Car Company.

### A Novel Thought.

A CURIOUS idea comes from an editor of a Cincinnati furniture paper in the shape of a suggestion that the American manufacturers of woodworking machinery should not be allowed to export it. The very logical reason given for this unusual proposition is that by the export of our machines we place in the hands of foreign manufacturers a powerful weapon to enable them to keep United States furniture out of their markets.

The idea leads the *Southern Lumberman* to humorously suggest that we also stop exporting food stuffs, and thus starve our competitors to death; for, since the improved machines we export must be operated by so-called pauper labor, it is foolish for us to send them anything to eat and thus help them continue in competition. By starving them out we would get their trade, presuming, of course, that starved people have any trade to get.

Still another journal, while commenting upon the subject, thinks that while it is true that labor-saving machinery is not only as freely used in Europe as it is in this country, and that particularly the furniture factories of Great Britain and Germany are not equipped as are ours, some of our manufacturers have come to find out that certain concerns abroad have more elaborate and better equipped plants than even the best factories of this country.

We hardly like to concede this point, which we deem is not well taken, and is not borne out by the fact that every day American-made furniture is extensively purchased in the most particular and fanciful markets of Europe, and that, too, against the odds of freight and cheap labor. The truth of the matter is that we lead the world in the matter of machinery—a condition of affairs that seems likely to continue.

The up-to-date manufacturer in this country finds it absolutely necessary to replace periodically the machinery which he has in his factory with newer and better appliances which the American inventor is constantly bringing upon the market. It takes time to get these newer mechanisms to the foreign manufacturer, and the foreign manufacturer is slower and more conservative about adopting them than is the American manufacturer. If the markets are opened to American wares our cousins east and west may be given the tools that we work with and they will not be able to compete with us in the manufacture of the goods which we may offer them. That has been abundantly proven. Nor will our labor be brought to the level of the "pauper labor" that we hear about. It's a different kind of labor to begin with, just as it is a different kind of mechanical skill which we succeed in developing in this country, and which finds expression in more and better labor-saving machinery than is made anywhere else in the world. No, it is not necessary to fence our machinery in with an export tariff such as our contemporaries believe in. Better make and sell all the machinery we can, then go on demonstrating to the world, as we are, that we can meet any competition which may be offered abroad.

### New Device in Beds and Bed Springs.

AN inventor of Providence, Rhode Island, has perfected a contrivance in metal beds and bed springs, and has organized a company in that city for the manufacture of his designs. From descriptions given they promise much in comfort and convenience. The chief attraction of the new spring beds is that they do not sag in the centre, but always allow the person resting upon them to lie in a natural and easy position. They are self-equalizing and remain level under all conditions. When a heavy sleeper is on one side and a light one on the other, both sides are on the same level. Adjustable to any weight the spring closes up like a book for convenience in handling. It is not possible to assume any position except the natural one, and strain in the back is prevented. The spring, which can be fitted to any bedstead, is composed of four crossbars and thirteen two-inch slats, running lengthwise, all of hard ash. Underneath on each side is a wide spring, pivoted in the centre and held loosely at the ends in sockets; there also are roller bearings. Under the wood spring is a rod bridged down with a spiral spring in the middle supporting the wood spring and reinforcing it back to the proper place when there is no weight on the bed. On each end of the wood spring is a bracket, which an eyebolt passes through and connects on a spiral spring playing in a socket hanger hooked on the bars of the bed. Thumbscrews in the centre adjust the bed to any desired tension, according to weight.

The bedstead has a number of novel features. It is made of tubes connected by screw couplings and is well braced. The head and foot frames can be lifted out of sockets readily, as neither carries any of the weight of the spring. This is pronounced a desirable feature, as the bedstead is very easily moved from room to room. The return tubing and the side pieces composed of tubes and upright connecting spindles insure strength and neatness of design, and the frame is much more rigid than if made of angle irons without braces. The lifting out of the head and foot frames is an especially valuable feature, as it gives free access to every part of the bed. This, in cases of sickness, will be found very desirable and is an advantage not to be had when the frames are inseparable.

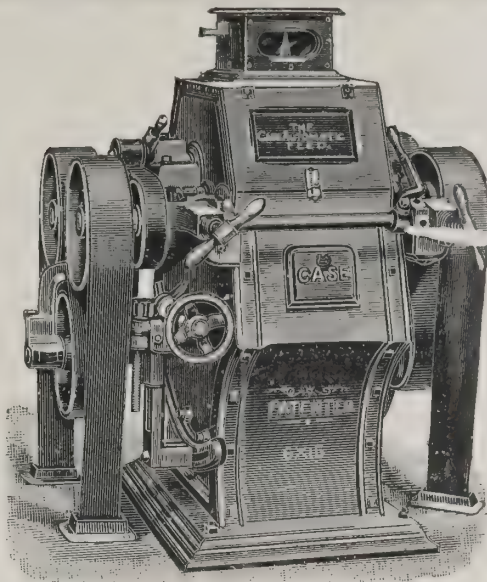
—Charles A. Strelinger Co., of Detroit, Mich., have issued a new catalogue of woodworking tools, one of the most complete that has come under our notice. In addition to the cuts and descriptions of almost every conceivable contrivance in the way of hand and machine tools for the woodworker, there is a valuable appendix to the work containing much that is useful in the way of information for contractors, mechanics and apprentices. The book is neatly bound in green cloth with silver trimmings.



# Flour, Rye, Corn Meal,

Two and Three Pair High  
Corn and Feed Mills,  
Two Roller Mills,  
Bran Dusters and  
Round Reels.

ILLUSTRATIONS CHANGE EVERY ISSUE.



# Buckwheat and Rice Mills.

Flour Dressers, Purifiers,  
Scalpers, Scalpers and Graders,  
and Corn Meal Bolts.

**THE CASE MAN'F'G CO.**  
COLUMBUS, OHIO,  
U. S. A.

## COFFEE MACHINERY.

### The Monitor Coffee Separator and Grader

Will make clean separations and grade in one operation.

### The Monitor Coffee Milling Machine,

The most perfect miller for coffee ever offered. It will do the finest work on tender as well as hard coffees, and do it without waste or breakage.

These Machines are in successful operation in many of the largest Coffee Houses in this country, and are well worthy of investigation by Handlers of Coffees.

Can be bought direct from manufacturers or through any reliable exporter.

**HUNTLEY MFG. CO., Silver Creek, N. Y., U. S. A.**

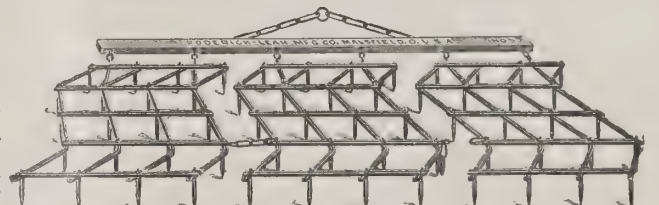
## THE LEAN ALL-STEEL HARROWS



Have been in the Market over 25 years and EXCEL ALL OTHERS.

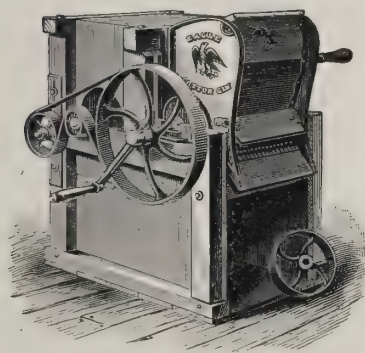
A large variety of Styles, Sizes and Weights suited to the Requirements of any Country. Manner of Packing secures Lowest Rates for Transportation to all Parts of the World. Write for full Descriptive Matter and Lowest Prices. In ordering through Commission Houses send Duplicate Order to us.

**RODERICK LEAN MANUFACTURING CO.,**



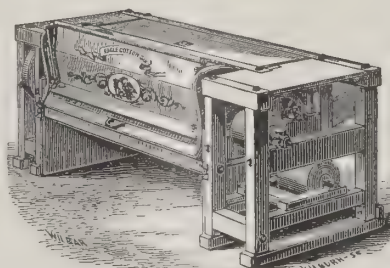
**Mansfield, Ohio, U. S. A.**

## EAGLE COTTON GINS.

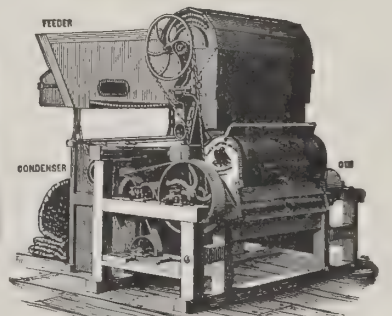


These Gins enjoy a BETTER REPUTATION THAN ANY OTHERS OF THEIR CLASS IN EXISTENCE, and are PREFERRED to all others made, on account of their STRENGTH, SIMPLICITY, DURABILITY, the amount and EXCELLENCE of the work they accomplish, and the RAPIDITY of their operation.

For further details, illustrated Catalogues will be furnished on application.



Power Gin with 12-inch Saws.



Power Gin with 10-inch Saws, with Feeder and Condenser.

**Eagle Cotton Gin Co. { FORMERLY Bates, Hyde & Co. } Bridgewater, Mass.**

IS SUPERIOR to "CORN STARCH," "ARROWROOT," "SAGO," Etc.



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(DUR YEA.)

This is a brand for a preparation from the choicest parts of Indian Corn, or Maize, making a healthy and nutritious article of food, and a most

**DELICIOUS TABLE LUXURY.**

ITS PURITY AND DELICACY ADAPT IT TO BEING USED IN A GREAT VARIETY OF EXQUISITE DISHES.

### ENCOMIUMS TO ITS MERITS:

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CENTENNIAL, 1876. "Notably and Absolutely Pure."

PARIS, 1878. "Best Produced of Its Class."

FRANKLIN INSTITUTE. "Superior Merit."

Gold Medal Awarded  
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Paris Exposition,  
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Put up exclusively by THE NATIONAL STARCH M'F'G CO., successor to (Messrs. DUR YEA) GLEN COVE MANUFACTURING CO., N. Y. U. S. A., in 40 and 20-pound boxes, in packages of 1 lb. and 1/2 lb., and may be obtained through all importing houses of South and Central America, and the West Indies, and all export houses of the United States and Canada.

None GENUINE without "DUR YEA" appearing on the face of Package.



## ELECTRICAL NEWS.

### American Electric Railway Equipment Abroad.

WHEN the Central London Railway a few weeks ago gave its order for car locomotive and electrical equipment to American manufacturers there was a considerable undercurrent of ill feeling noticeable in the comments of the English daily press, which took the stand that these orders ought to have gone to English firms. It is a satisfaction to note, however, that no such grumbling was manifested on the part of the English technical, electrical press. The reasons which dictated the giving of the order to America are well put in a recent interview with the secretary of the Central London Railway, published in the *Railway News* of London. That gentleman states that his company was influenced by the advice of the best electrical experts, who stated that the more extensive use of electric traction in the United States had brought the manufacture of plant and material to a higher pitch of perfection and to a much lower cost than they could be got at in England. Our tools and manufacturing machinery were much in advance of theirs, as was to be expected when the small amount of electrical traction construction in England is considered; and as it was the desire to equip the line in the very latest and the best manner, no recourse was left but to go to America for the material. This tells the story in a nutshell. American electric railway apparatus goes to England for the same reason that smaller American machine tools find a profitable market there. It represents, as do the latter, a product peculiar to American skill and experience, and as long as we keep in the van with these manufactures we will probably find a market for our goods. It must be apparent, however, that as time passes the English manufacturers will gain that experience which is now our particularly valuable stock in trade and that we cannot always hope to secure such sweeping orders as that for the Central London Railway equipment. But by keeping in advance we may still hope to stave off that day for some time to come. If England does not go extensively into electric railroading her market for such electrical apparatus will be ours. Should she develop a large electric railway industry she will certainly manufacture herself the supplies necessary. The present situation reflects on her slowness in making the change from horses and steam, and not on the ability of her electrical engineers and manufacturers.—*Electrical Engineer*.

### Electrical Exposition at Niagara.

IT is proposed, says the *Electrical Engineer*, to hold a Pan-American Electrical Exposition on Cayuga Island, Niagara Falls, in 1899. Cayuga Island is not exactly within the limits of the city of Niagara Falls, but it is not far distant, and by mentioning it in connection with the Falls its location is well defined, for who does not know of Niagara Falls? The project has been before the public through various announcements for some little time, but now the promoters of it state that their plans are maturing so that their permanent organization will be soon formed. Captain J. M. Brinker, president of the Niagara Falls and Lewiston electric road, is at the head of the scheme, and he has interested several prominent men, among them General Superintendent Edgar Van Etten, of the New York Central, who can do much to make the project a success.

It is the idea of the promoters that the exposition shall represent and display the progress made during the last century, and especially is it designed to portray the progress made in the electrical field. So far as possible, the power and light used on the grounds will be furnished by electricity generated in the great power houses at the Falls, and in every way will the progress of the century then closing be compared with the past. It is the idea of the men who are back of the scheme that as the Falls of Niagara draw about 500,000 people to see them annually, the additional attraction of the Pan-American Exposition will swell the crowds of visitors to proportions far beyond those ever seen at any exposition in the world.

The desirability of Cayuga Island as a location for such a great exposition as is proposed will be well understood when it is stated that to-day the trains of the New York Central, the West Shore, the Michigan Central, the Lake Shore & Michigan Southern, the Lehigh Valley, the Canadian Pacific, the Wabash, the Erie, the Rome, Watertown & Ogdensburg and the Grand Trunk railroads pass within 200 feet of the island on their regular runs. Thus, the railroads of the country lead to Cayuga Island. In addition to this the cars of the Buffalo-Niagara Falls trolley line pass still closer, while, as the island is located in Niagara River a safe distance above the Falls, steamboats from the Great Lakes can land their passengers right on the exposition grounds.

### Electric Engine for Canal Boats.

THE principle of the rack railroad, familiar to the mountain-climbing public as well as to the engineer, applied to an electric traction system on canals, is substantially the basis of the plan which a New York inventor proposes to follow in displacing the traditional canal mule, says *Current Topics*. Along the bank of the canal, supported on piles, the inventor proposes to lay a rail of suitable section to support and guide a small electric locomotive whose driving wheel is a spur wheel, deriving motion from the motor proper through a train of gearing, and meshing with a rack forming part of the rail. Supply and return currents to and from the motor go through conductors strung along the track level on the side opposite the rack, a double trolley being used. The rack arrangement, as in steep mountain railroad construction, of course provides for the easy climbing of the heavy-grade portions along the

canal, at locks, without necessitating the use of great weight in the locomotive; in fact, the extension of the rack along the whole length of line enables the use of this principle on the level stretches as well, so that the tractive power is secured through the gearing and not through great adhesive weight. The advantages so secured are obvious—a minimum weight of locomotive, minimum weight of track, with all that this implies in reduced cost of construction and positive motion. The locomotive may be controlled either directly by an attendant, or by a man on one of the boats in tow, in which latter case the stopping and starting lever and the reversing bar are worked by ropes running to the boat. The whole arrangement seems simplicity itself. Nothing is proposed that experience in other, though similar, lines has not shown to be perfectly practicable, and we may, therefore, find in this one of the coming methods of mechanical canal haulage, with the time honored canal mule relegated to the same position that the trolley system on tramway lines has prepared for the once prominent car horse.

### Tesla's Electric Oscillator.

AT the meeting of the British Association held in Toronto last month a very interesting paper was read, prepared by Nicola Tesla, the celebrated New York electrician, on a new electrical oscillator, and an exhibition was given of the apparatus which was invented by him.

The invention shown was a new machine for making Roentgen rays of extreme penetrating power. It is designed to take the place of an ordinary induction coil, for the purpose of exciting a Crookes tube, and was said by Professor Birker, of Philadelphia, who had seen it work in Tesla's laboratory, to furnish such a strong excitation that with a fluoroscope he was enabled to look through Tesla himself with the greatest ease.

The device consisted of two large coils of wire mounted on a neat wooden base, which contained inside of it a new type of condenser made by Tesla himself. One of these coils acted as a magnet to make and break the current, and at the same time helped to charge the condenser. This latter in turn threw its electric power into the second coil, which acted like an ordinary induction coil, but with extraordinary efficiency. According to the scientists present, this scheme was an entirely new mode of using condensers. After the reading of the paper by Professor J. McClellan the room was darkened and the current turned on. With a current from an ordinary incandescent lamp sparks were produced six inches long. Then two fine wires tied to glass rods were stretched out parallel from the terminals. Immediately a band of glowing phosphorescent light was formed between the two, diversified with frequent brilliant sparks. During the discussion which followed several diverse theories were advanced to account for the operation of the new invention.

### The Cost to Stop a Trolley Car.

RECENT experiments in the cost of running the trolley cars which have become so general in this country have brought to light some very interesting statistics. There is an old adage to the effect that what is worth doing at all is worth doing well. Because we cannot see the force that propels the trolley car we are apt to forget that the humble duties of the motorman require intelligence. It looks as if he just turned a handle and that was the end of it, but the real truth of the matter is something very different. It requires less current to keep the car moving than to start it, so that a large number of starts and stops means a large consumption of energy.

It is shown that the cost of one stop on each trip of a car during a year on a 15 car line may amount to \$70, or to \$467 for a 100-car road; so that if these figures are multiplied by two stops at each crossing on a road operating long lines the large cost is evident. Careful handling of the controller will save over \$1,000 a year on a 15 car road and \$7,000 a year on a 100-car road. The difference between a careful motorman who has been well instructed and a careless one may amount to from 3 to 8 per cent. of the total energy consumed. It is perfectly safe, according to this authority, to say that 10 per cent. of the energy can be saved by more careful handling of the controller, while on most roads at least 15 per cent. could be saved without doubt. The maxim of every motorman should be: "Use the brake as little as possible and drift as much as possible." The employment of skilled motormen capable of understanding the mechanism they handle would result in a saving to the trolley companies, even though a higher salary were paid the men, and at the same time add much comfort to the passengers.

### Modern Inventions.

SOME idea of the extent to which modern inventions have broadened industry is furnished by the statistics of the various enterprises which depend upon electricity.—*Utica Daily Press*.

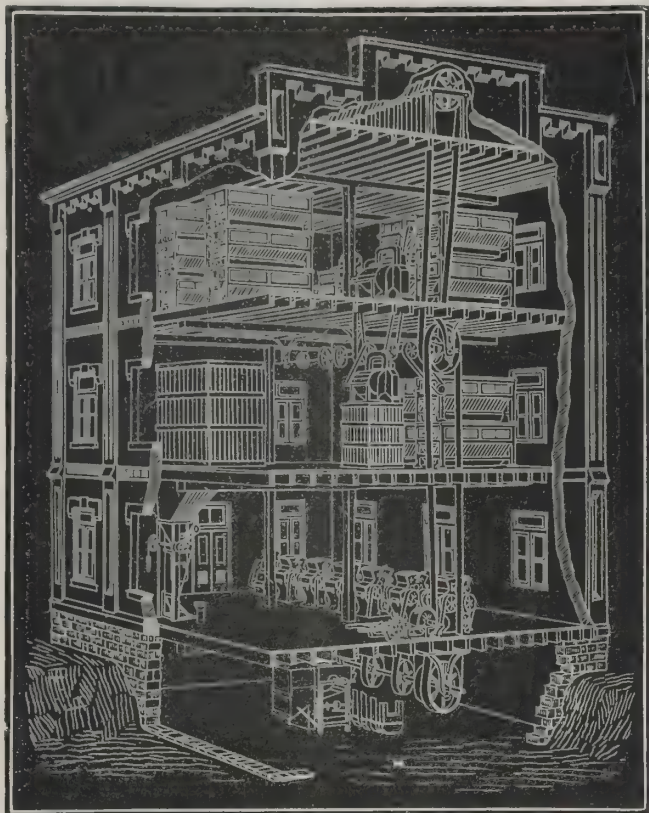
True, and one can hardly find a better illustration of the falsity of the old cry that improved machinery is an injury to labor. More than 2,000,000 of skilled workmen and ordinary artisans get a living out of electricity. There are the telegraph and the telephone, which give constant employment to a large army of laborers. Then the electric-light system extends to all parts of the country and demands another army, almost equally large.

Electricity may deprive a dozen men of their old-time tasks, but it calls for two dozen to do other tasks, with good wages. There is no use in having a crick in your neck looking at the past and warbling about "the good old days." There never were better days than these, and there never were more contented people than can be seen right here and now.—*New York Herald*.



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We make Latest Improved Machinery and build Mills on Up-to-date System.



All kinds of Milling and Cleaning Machinery on hand, 28 sizes and styles of Portable French Burr Mills.

When in need of a Flouring Mill Roller or French Burr System write to us for prices. Catalogues mailed free. Especial care used in packing. We manufacture the largest and finest line of machinery in the world for the production of Flour, all grades, and of Hominy, Grits, Meal and Corn Flour for Distillers, Brewers and Domestic Uses.

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## LaMONT'S

### Improved Crystallized Eggs.

## Crystallized Eggs.

Simply fresh candled eggs removed from shell and dessicated; staple in markets of United States; used for thirty years by all leading bakers; used for every purpose that the fresh shell egg may be used for, including scrambling, omelets and custards.

## Crystallized Eggs.

Keep in any climate; unexcelled for bakeries, army, navy, hospital, sea or family use generally.

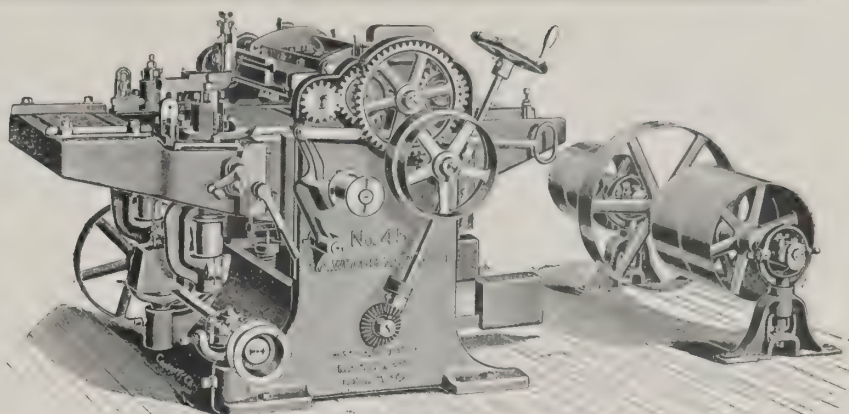
No breakage, always reliable and evaporated in the lowest egg market in the United States, therefore cheap.

In the United States sold only in barrels of 250 pounds, equal to 1,000 dozen eggs. For export, packed in tins to suit.

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No. 45.—Planes one side and matches up to 12 inches wide. Works 6 inches thick, or will plane one side 24 inches wide without matching. Weight, 2,700 lbs. Packed for sea shipment. Measures 160 cubic feet. All goods delivered free on board steamer.

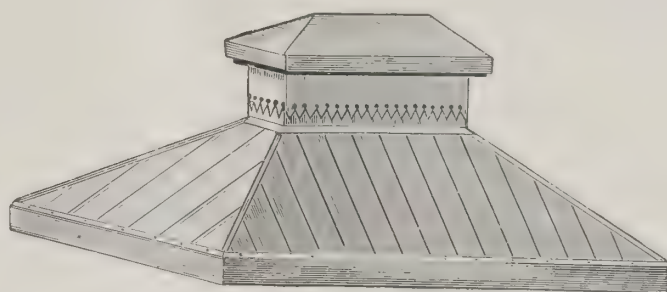
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## Wood-working Machinery.

A complete catalogue free.

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If your house has a poorly lighted room it isn't complete without a skylight. If the skylight has a ventilator you add further to the comfort of your building. We are making large quantities of them, and know the right way and how to avoid the wrong way of constructing them. They should be of sheet metal to be durable and satisfactory. Packed in sections for exporting, to reduce shipping expense. Your local mechanic can easily erect them in place.

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We also export, in large quantities, METAL CORNICES, CEILINGS, BUILDING FRONTS, WINDOW AND DOOR HEADS, BAY WINDOWS, FINIALS, CROSSES, CHURCH ALTARS, etc., made of iron, steel, zinc or copper.

Send us your building plans for estimate. Catalogue free.

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LEADS THEM ALL,

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We guarantee this Copper Paint to be the easiest to apply and, owing to its being so finely ground, it is the smoothest paint in the market.

Highest Medals from American Institute, New York City,

NEW JERSEY RED COPPER,

For Yachts. Brightest Color Made.

NEW JERSEY SEAM PAINT,

A Perfect Substitute for Pitch.

NEW JERSEY PAINT WORKS,

HARRY LOUDERBOUGH, Proprietor,

JERSEY CITY, N. J.

U. S. A.

REMARKABLE FACT.

This cut is a copy of a photograph of a board having one end painted with New Jersey Copper Paint, manufactured by Harry Louderbough, proprietor of NEW JERSEY PAINT WORKS, Jersey City, N. J., U. S. A., and placed in the water at Port Royal, S. C., for five months. Upon the unpainted end you can note the ravages of the salt-water worm so destructive to wood, and also the large number of barnacles that have fastened upon it. Observe the painted end, where New Jersey Copper Paint was applied—its splendid condition.

The board here represented was placed in the water at Port Royal, S. C., by me, and left in the water five months. The painted end was as good as when it was placed in the water.  
MILLS EDWARD, Master Schooner "Florence Shay."



# Hunt

## Saddles Are Famous the World Over

FOR THEIR SUPERIOR QUALITY, DURABILITY AND COMFORT.

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Send for catalogue showing many different patterns.

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WESTBORO, MASS.  
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The felt pads are supported on a laced framework of tough but elastic leather thongs.

## IMPERIAL Bicycle Lanterns

ARE FAVORITES THE WORLD OVER.

**WHY?**

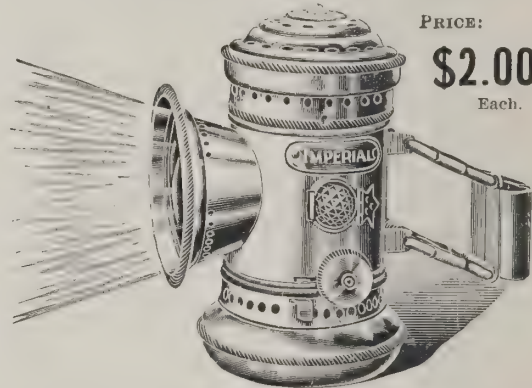
They will neither blow out nor jar out.  
They are strong, safe, clean, attractive.  
They are made from the very best material and possess positive merit.

MANY NEW FEATURES. PRICES REASONABLE. SEND FOR CATALOGUE.

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THE E. P. BRECKENRIDGE CO.,

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PRICE:

**\$2.00**

Each.

## THE BLACK MFG. CO., - ERIE, PA., U. S. A.

We build bicycles of the finest quality only and have nothing to offer either in cheap or medium grade wheels. Our discount for export is 30 per cent., and we deliver machines properly boxed f. o. b. New York. Order through your commission house and send copy of order direct to us.



TRIBUNE MODEL 27.

Price \$100. Weight 23½ lbs.

This is our standard men's wheel and is suitable for all kinds of road use. It is built in three heights of frames, 22½, 24 or 26½. The wheels are 28 inches diameter; 28 inches will be furnished if preferred. Gear, 68; options, 60, 63, 72, 73 or 80; cranks, 6½ inches, 7 inches if preferred. If not otherwise specified, all machines will be fitted with Hartford or Morgan & Wright tires. All wheels are supplied with tool bag, tools and repair kit. Regular finish, black enamel, nickel trimmings. If a lighter wheel than the above is desired, order should specify Model 21, which will weigh with light road equipment about 20½ lbs.

## Tribune Bicycles.



TRIBUNE MODEL 24. Price \$100.

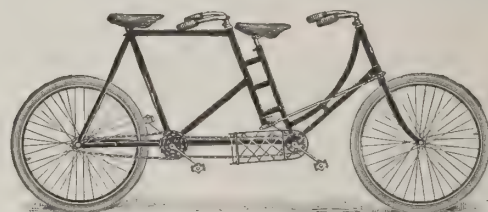
Our ladies' wheels are built in three heights of frames, 20½, 22½ or 24 inches. 20½ inches is standard and will be shipped if not otherwise specified. Wheels, 28 inches, can be furnished, with 26 if preferred. Regular gear, 63; options, 56, 60, 68 or 72; cranks, 6 inches throw. The weight is about 24 lbs.

The Celebrated  
Cycloidal  
Sprocket.



Used on

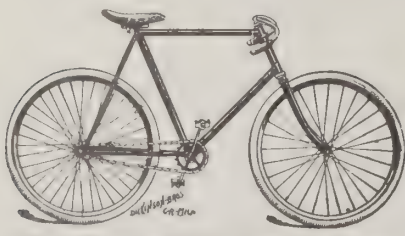
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Bicycles only.



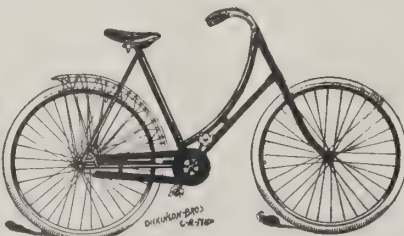
TRIBUNE MODEL 23.

Price \$150. Weight 44 lbs.

Our tandems are also built with double diamond frame for use of men riders. Wheels are 28 inches; height of frame, 24 inches; ladies' forward frame, 20½ inches. Gear, 68; can fit with 72, 76 or 80, if desired.



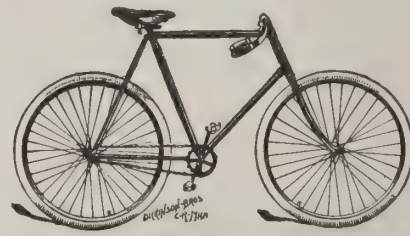
Halladay Roadster, \$100. Discount, 45 per cent.



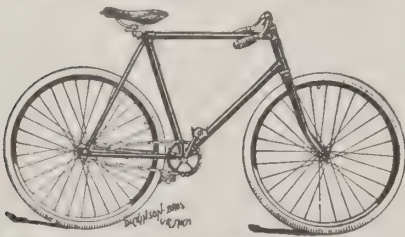
Lady Halladay, \$100. Discount, 45 per cent.



Lady Aetna, \$75. Discount, 50-5 per cent.



Aetna Roadster, \$75. Discount, 50-5 per cent.



26-inch Boys' Aetna, \$50. Discount, 40 per cent.

## MARION CYCLE COMPANY,

MARION, IND., U. S. A.

The Largest and Most Complete Line of Bicycles  
made in America.

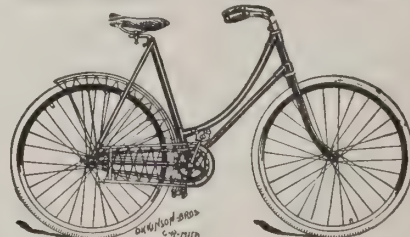
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Strictly of the Highest Grade.  
Absolutely Guaranteed.

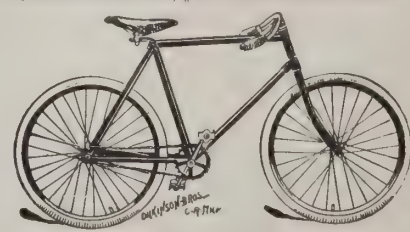
Prices quoted with discounts are our BEST and cannot be beat for quality offered. Can refer to largest dealers in America. Complete line for reliable service. Orders accepted through reliable commission houses. Mail exact copy of order direct to us. Direct orders must be accompanied by Draft on New York or San Francisco. All goods carefully boxed for ocean shipment, F. O. B. New York; or delivered San Francisco or New Orleans, \$1.00 net extra per machine. Send for Art Catalogue mailed free.



24-inch Girls' Aetna, \$40. Discount, 35 per cent.

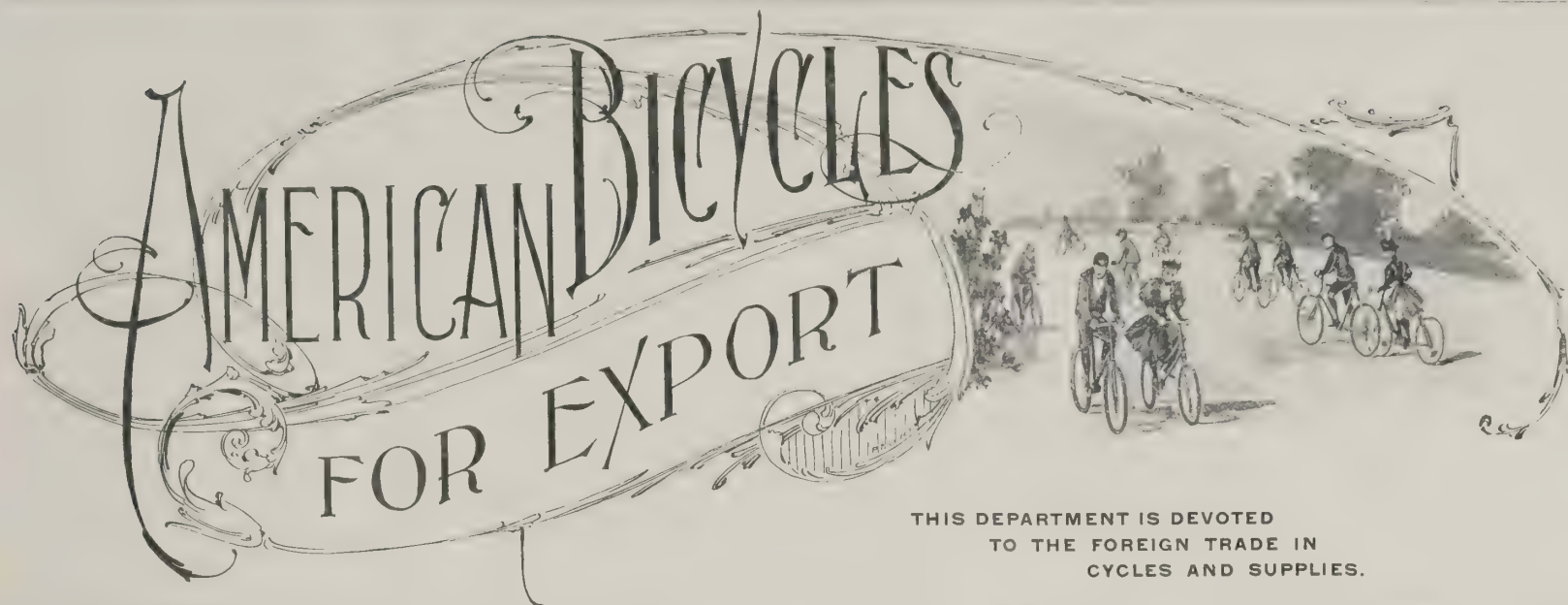


26-inch Girls' Aetna, \$50. Discount, 40 per cent.



24-inch Boys' Aetna, \$40. Discount, 35 per cent.





THIS DEPARTMENT IS DEVOTED  
TO THE FOREIGN TRADE IN  
CYCLES AND SUPPLIES.

### A Cranky Agent.

THE following is an extract from the manager of the London branch of the Western Wheel Works, who defends the American trade from the attacks of a rather cranky agent. The letter appeared in some of the daily papers here:

"Our attention has been called to a letter which appeared in recent issues of several of the cycle trade papers from Mr. W. R. McTaggart, commenting upon the present state of the cycle trade. He expresses his opinion that the demand of all the leading cycle manufacturers is far in excess of the supply.

"We are in a position to know that such is not the case, and the following advertisement which appeared recently in the *Daily Mail* speaks for itself:

"Bicycles cheaper to-day. Marvellous reductions—no reasonable offer refused. Prices open at £11 10s. Send for photograph, free on application, or better still, call, W. R. McTaggart, 172A, Regent street, London, W."

"Again, Mr. McTaggart does not think that American cycles will affect first-grade British cycles, and in confirmation he goes on to say that he bought samples from eight of the leading American manufacturers, but was obliged to sell them at 55 per cent. under cost.

"We think we can claim to be amongst the leading eight American firms, and we have never had the pleasure of doing business with Mr. McTaggart.

"Notwithstanding his bitter experience with American machines, we can truly state that we have been doing a steady and increasing business up to quite recently, though we admit that sales have fallen off since the recent drop in the prices of English and American machines

"There is no doubt that the introduction of American machines into England has affected the whole of the English trade. It is an undisputed fact that American cyclemaking machinery is the finest in the world, and we contend that first-grade American cycles are equal in every respect to first-grade English cycles.

### A Power Transmitter.

NEW ideas of any practical value are very scarce in the bicycle world, notwithstanding the host of pseudo-improvements and the endless list of practicable and impracticable inventions. A device called a power transmitter, the ingenious contrivance of two young men of Cincinnati, however, calls for more than a passing notice. If their theories, which seem to harmonize with the principles of mechanics, are not altogether at sea the inventors have solved a problem which has puzzled mechanics for a long time, and in so doing they have evolved an idea that is new to the cycle world and which promises to be of great benefit.

The claim for the transmitter is that of a mechanical contrivance to gain speed without loss of power. The idea is really a very simple one, but to persons unversed in mechanical lore it is not a very easy matter to explain. The power transmitter is located at the hub of the rear wheel. The ordinary chain passes over at the rear wheel on what answers the same purpose as the ordinary small sprocket wheel. The sprockets of this wheel are loose, and are really a part of a large sprocket wheel. The latter consists of parallel disk wheels attached to the hub of the wheel. Resting upon the small sprocket wheel are extended levers which fit into specially constructed grooves at some distance from the centre of the hub.

As the chain pulls at one point of the inner sprocket the extended lever engages one of the grooves and transmits the power to that point. If this is really understood it will be seen that the same force that is applied to the small sprocket is transmitted to a greater radius, and hence with the same exertion additional speed is attained. Unlike the present method, the pulling section of the chain on the rear sprocket does not cover one-quarter of the circumference thereof, but only the point near the top, thereby making the resistance considerably less and allowing the difference in power required to be transmitted to where it will do the most good.

All the points of the invention have been studied with the most scrupulous exactness as to detail, and mechanics have expressed themselves as feeling that a much desired want has been supplied. Bicyclists have examined and tested

the new apparatus, which is being displayed in a bicycle shop in Cincinnati, and state that they have been surprised at the wonderful results obtained. It is firmly believed that the invention, so simple in itself, will prevent the chainless wheel from becoming popular.

### Chainless Wheels.

WE hear a good deal about chainless wheels from abroad, and there is a little said, too, about them at home. They, however, appear to be essentially a foreign idea, which, so far, has not found much favor on this side of the Atlantic—and we profess to leadership, too, of the manufacturing bicycle trade. From the rider's point of view we as yet cannot see anything to be gained by the innovation, unless it be certain novelty, that at best is not counterbalanced by very apparent disadvantages.

For some time past cyclemakers of France and of England have been experimenting so far with chainless wheels as to place them upon the market, and from all accounts quite a number have been sold. We question very much, however, whether the purchasers were experienced riders and, if so, whether they were not influenced as much or more by the novelty of a new machine as by any practical benefit to be derived by the substitution of a gear for a chain.

Occasionally one sees here what are known as freak bicycles—machines propelled by a treadle in lieu of pedal and machines with wheels of unequal sizes, the smaller in front—we rather admire the courage of the riders. The cycles were no doubt built and purchased upon the strength of certain theories of mechanics that appear to stand a deal of reasoning, but when put to the practical test of experienced popular opinion fall far short of improvement upon the older, well-tried designs. If a maker's ideas are good, sound and practical his wheels must come to the front and stay there until some one else goes him one better. But in every case the public must be the judge, and the cycling public is now so great and so critical that their judgment can be relied upon implicitly.

Unless some very important changes have recently been made in regard to chainless wheels popular judgment will be against them. A proof of this is that they are never seen upon the race track. Had they the slightest advantage they would be snapped up at once by the professional riders.

To make such a radical change the makers must be certain of not merely equalizing conditions, but of adding a decided advantage to older methods. For many reasons we are led to doubt seriously that this can be done.

A correspondent—one of the leading manufacturers of the United States—in writing to THE AMERICAN EXPORTER, reasons out mechanically the why and wherefore of this opinion. He says: "As to the matter of the chainless wheel, we do not believe that it will ever be a success for this reason—as a practical fact, which can be demonstrated beyond any question of a doubt, there is actually more force required to push a wheel with gears than with the chain. Of course, every one knows that the chain is objectionable, but, at the same time, what is the object of going from the chain to some device which is very objectionable in a great many different ways. The simple fact that the same speed going uphill cannot be attained in the gear system places it where it never can be used to any special advantage, and this is a fact that has been demonstrated by one of the largest manufacturers of the bevel gears.

"There is another feature about the chainless wheel which is going to be more of a detriment to it in our judgment than the above, and that is that the gears are very nice indeed if they would always prove as satisfactory as they do on a brand new lathe, or something of that kind, but where they are the least bit out of order they are the most wretched things that could be devised. Inasmuch as this is the case it is, as you will readily see, practically impossible to place them in the hands of the ordinary rider with any assurance that they are going to keep them in any kind of condition, and should they get out of order to any great extent it can be readily demonstrated that it would take a first-class mechanic to keep them in repair."

These views of a very practical man at the head of the trade are uniformly shared by all the large makers we have heard from, and we would caution dealers to be very wary about placing important orders.



### Sprocket Efficiency.

**M**OST bicycle riders are interested in discussions on the size of rear sprockets. A year ago the use of seven-tooth sprockets was general. But in 1897 the leading makers in this country have nothing smaller than eight teeth, and many employ nine and ten teeth, at the same time increasing the size of the front sprocket to give the gear required. Mr. J. G. D. Mack recently reported at a meeting of mechanical engineers the results of tests which seemed to give definite information as to the preferable number of teeth on the rear sprocket. In determining the comparative efficiency of sprockets of different size the bicycle was inverted and the frame securely attached to the floor. A thin steel band had one end attached to the tire, and the other end carrying a weight which was raised by the band being wound upon the tire, a second weight being hung from a scale pan attached from the pedal, whence the efficiency of the portion of the mechanism transmitting the power can be calculated. A long series of readings were taken with the same large sprocket with seven, eight and nine tooth sprockets on the rear, and with the pedal weights varying from two to fifty pounds. The average efficiencies in each case were as follows: Seven tooth, 89.9; eight-tooth, 91.5; nine-tooth, 93.4. This shows the eight-tooth to have 98.9 per cent. of the efficiency of the nine-tooth, and the seven-tooth to have 96 per cent. of the efficiency of the nine-tooth sprocket, other conditions being equal. In actual service, however, the largest rear sprocket which the required gear ratio will allow is to be preferred, from its better wearing qualities, due to the smaller chain pressure upon the teeth.

### Patent Tire Protector.

**A**LATE invention for the protection of pneumatic tires comes in the shape of a device for that purpose invented by W. G. Downie, of Pomeroy, Ohio. It consists of a circular strip of fabric three inches wide, through the centre of which and on the outside runs a strip of rubber one and one-half inches in width, tapering at the edges. This is vulcanized into the fabric. The edges have a vulcanized hem, through which passes a wire cord so fastened as to form a circle slightly smaller than the protector so it will draw down on the sides when the tire is inflated. To put on the protector the tire is deflated, when one of the forks is loosened and the device slipped over the tire, care being taken to get it in the centre. The tire is pumped up for use. It is claimed by using this appliance punctures will be less frequent and it prevents the tire from wearing out. When not in use it can be taken off and put in the pocket. Weighs 10 ounces.

### X-Rays Rendered Harmless.

**E**LLIOTT WOODS, Superintendent of the Capitol, who has attracted a great deal of attention by his success in preventing the injurious results following the use of X-rays, does not claim to be the inventor of the principle he applies. He relates that he derived his first idea of it from reading a paper by Nicola Tesla.

Mr. Tesla told of the use of a sheet of aluminum to receive the bombardment from the Crookes tube, and this suggested to Mr. Woods the use of some thin metallic substance, the presence of which between the tube and the object would not be perceptible on the screen.

The theory of Mr. Woods is that electric waves are set in motion and projected from the tube, which cause, in some cases, and especially when powerful apparatus is used, electrical decomposition of the tissues, or burning, as it is generally called. He told me he believed almost any metallic substance would answer the purpose about as well as gold leaf, which he uses because it can be readily obtained beaten to extreme thinness.

His method is to paste the gold leaf on a cardboard and connect the metal by wires to a ground wire, so as to carry off all electricity which it may intercept. He said he found it was possible to obtain an electric spark from the hand when submitted to the X-rays if the gold-foil screen was not interposed. When the screen was interposed, however, it was impossible to obtain the spark from the hand.

Mr. Woods, by the use of this apparatus, has been able to use the X-rays with great success in a large number of cases without any disastrous results. He said he believed the greatest danger in the use of the rays came from carelessness or incompetency. He is about to undertake a series of X-ray pictures, showing the progress of the healing of fractured bones from day to day, which are expected to be of great interest to surgeons.

### New Punching Press for Small Work.

**M**R. E. W. BLISS, of Brooklyn, N. Y., has designed a new type of punching press for small work. The press is especially adapted for operating small cutting, perforating and forming dies, such as are extensively used in the manufacture of tinware, brass goods, burners, gas fixtures, umbrellas and pocket-book trimmings, jewelry, buttons, etc. It is also largely used for operating cap combination dies in fruit can factories.

This press is provided with a clutch which responds to the action of the foot treadle almost instantaneously. It can be operated with considerable speed, and in most cases where foot presses are used can be substituted to great advantage. The weight of the machine is 500 pounds, and it occupies a floor space over all of 31x26 inches. The machine is also supplied without legs, in which case it is used as a bench press, and weighs 350 pounds.

### Greatest Umbrella Known.

**T**HE famous Eiffel Tower and the celebrated Ferris wheel are to be rivalled at the Omaha Exposition by the greatest umbrella of modern times. Standing upon a bluff facing the Missouri River, it will carry passengers in its cars to a height of 575 feet above the level of the river. The umbrella will be anchored in a stone foundation 30 feet deep by 75 feet square. Its structure will be of iron and steel, rising 350 feet above its foundations. With a diameter of 40 feet, it will have a circumference of 126 feet.

On the sides of the standard, running from the bottom up, will be 40 rails, forming ten tracks for the lower platform to move up and down. On this platform will be a circular track on which another platform is to revolve, the latter platform holding the standard which supports the arms of the umbrella.

The arms are to be 110 feet in length, at the extremities of which the cars are to be suspended. From the outer end of the arms cables will reach to the top of the standard, connected with counter weights, which travel up and down on the inside of the standard. The cars will be constructed on the same principle as those of the Ferris wheel, built of iron and steel, and will hold forty passengers each. There will be sixteen of these cars. The lower platform will also be used by passengers, having a carrying capacity of about 200. This platform will rise to the height of 240 feet.

The whole machine will be operated by electricity. Each car will be lighted with different-colored electric lights, and on the top of the standard will be a searchlight, which the exposition company will provide. The umbrella will make three trips an hour.

With such an umbrella as this the neighbors of Noah who kept out in the wet might have postponed their final bath.

### An Instrument for the Shop's Oculist.

**N**EVER a day passes in loop machine shops that some flying spark, shaving or filing does not find a mark in the eye of some unfortunate, and there is always one man to be found in that shop more expert than his fellows in the art of giving relief. The shop eye doctor he is called, and his services are frequently in demand.

To this amateur oculist we would describe a new tool that he will find a valuable addition to his kit.

It is a magnetic instrument and one that he can easily make for himself after the following fashion: Take a piece of steel, about 5 inches long and  $\frac{1}{2}$  inch in diameter; draw one end out into any desired shape, leaving most of the stock for a handle. Draw the temper of the thin part to a light blue, leaving the handle hard. Place the instrument for a few seconds on the pole piece or yoke of an electric motor or dynamo, while the machine is in motion; repeat this two or three times. Be careful not to let the instrument be drawn into the moving parts of the machine. The material for the instrument should be a cheap and coarse-grained steel that will harden well, rather than a fine-grained tool steel. The bulky handle acts as a warehouse for the magnetic energy. The magnetism will be retained in the handle for a considerable time, and being fed to the point of the instrument in contact with the eye, will readily gather up any stray particle of iron or steel dust lodged therein.

### A Novel Idea.

**A**N original idea for advertising the timber and lumber interests of the State of Washington has been suggested by Editor V. H. Beckman of the *Pacific Lumber Trade Journal*. He believes that the timber resources of Washington should be displayed in the most striking manner at the Trans-Mississippi Exposition at Omaha next year. The Washington Building at the World's Fair was a great advertisement for the State, but Mr. Beckman's idea for the Omaha show embraces a still more attractive display. He suggests that a log containing 10,000 feet, board measure, be shipped to Omaha and left on the car in the grounds for some time during the exposition. On a certain day he suggests that it be announced that the log will be converted into a house. He would have the scheme worked in connection with the sawmill exhibit that will undoubtedly be on the grounds, and when the log is squared there will be enough material in the slabs to make the shingles of. He would also have the siding, flooring and finish for a story and a half cottage sawed out of a big log and have the lumber dressed in the planing mill exhibit, and then put into the structure. If there should be a pulp and paper mill exhibit on the ground he would convert the refuse into building and wall paper to be also used in the house. Other industries of the State of Washington might contribute something to the furnishing of the house. Without doubt Mr. Beckman's suggestions are new and altogether unique.

**T**HE Hamburg liner *Fürst Bismarck* left New York September 21, 1893, and made the trip to Southampton, England, in six days, ten hours and fifty five minutes. This steamer has a tonnage of 8,874 and a horse power of 16,400. According to Lloyd's Register its length is 502 feet 6 inches; breadth, 57 feet 6 inches; depth, 38 feet. The American liner *St. Louis* left New York September 1, 1897, and made the trip to Southampton, England, in six days, ten hours and fourteen minutes, forty-one minutes less time than the record of the *Fürst Bismarck* in 1893, which until now has been the "record trip of the world."

—The steamer *La Normandie*, which sailed on the 17th ult. for Havre, carried over in plate, pigs and bars nearly \$100,000 worth of copper, the product of two concerns.





**Women's No. 6, 25 lbs., \$100.**

F. O. B. New York.

**EQUIPMENT**—Saddle, pedals, tool bag, tools and tire-repair outfit.



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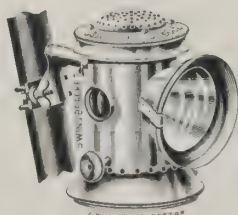
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For the Leading American Wheel Order the "GREAT EASTERN."



**It is up to date,  
very handsome and  
attractive,  
beautifully finished  
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SEND FOR 1897 CATALOGUE "B."



ALSO ORDER THE

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It is a perfect burning light; it will not jar out; it has a swing bracket, and will always stand perpendicular no matter where you lean the wheel.



**EASTERN CYCLE MFG. CO., Amesbury, Mass., U. S. A.**



### The Vistascope.

MR. WILLIAM A. EDDY, to whom allusion is made in an article in this issue upon Kites and Kite Flying, has recently added much of interest to the pastime of flying kites by the contrivance and adoption of an instrument in conjunction with his kites which he calls a vistascope. The vistascope is really a modification of what is known as the camera obscura.

A few weeks ago Mr. Eddy gave an exhibition at Bayonne, N. J., of the workings of his peculiar contrivance, and showed to the interested crowd a perfect but condensed view of the surrounding country. First he sent up a team of four kites and ran up the line his vistascope, which measured 5x2½ feet.

All the conditions were favorable. There was a good wind and bright sunlight, and the pictures shown in the vistascope were brilliant and clear. The apparatus was sent up to a height of about 150 feet. Then Mr. Eddy, lying flat on his back, with a powerful field glass, looked up at the reflector of the camera obscura. There appeared with great clearness the Kill von Kull, about 1,000 feet distant, which is completely shut off from the view below by trees and houses, and beyond this the Staten Island shore. Houses and trees a mile and a half distant could be distinctly seen. Next the kite cord was let out until the vistascope was 300 feet in the air, but the trials were less satisfactory, because of the swaying of the line, which rendered it extremely difficult to follow the motions of the apparatus with the field glass. A score of persons, including an expert photographer, looked at the view through the vistascope, and pronounced the experiment an entire success.

The vistascope looks like a huge magic lantern. It is contrived on the lines of the ordinary camera obscura, but the pictures are thrown from a mirror set in the top upon a sheet of semi-transparent paraffin paper. This does away with the reversed effect of the ordinary camera obscura. By lying on his back with his feet toward the view to be seen the observer sees the landscape stretched before him right side up and in its proper condition. Moreover, there is a peculiar effect of being in the air on a level with the vistascope and looking out over a level stretch of the country. The value of the contrivance lies in the fact that by its use a man can look over a hill without having to climb it, and see what is on the other side.

Recently Mr. Eddy sent up three pairs of lanterns, white, red and green, on a kite string, out from the State of New Jersey over Staten Island, in the State of New York. At present the vistascope is fastened in the Eddy front yard about fifteen feet high, and one lying down under it can get a good view of the level stretch of country in that part of Bayonne.

### New Gearing Arrangement for Lathe Headstocks.

A NEW lathe has been built by a machine-tool company of Lowell, Mass., which has a novel arrangement for driving gearing designed to give an increased number of speeds, and especially to give speeds suitable for small work when for any reason it is desired to do such work in the machine.

The lathe will be seen to have the usual back gear and internal gear on the face plate, and, in addition to this, a pair of gears of equal size upon the cone spindle and the main spindle, these gears being connected together by an idler which is arranged for throwing in and out of mesh by sliding endwise. The pinion meshing with the internal gear on the face plate is formed on the end of a sleeve which slides endwise upon the cone spindle from which it is driven by a feather. The endwise movement of the sleeve by which the pinion is drawn within the bearing and out of mesh with the face plate gear is by a yoke engaging with a groove in the sleeve, the yoke being operated by the rack and pinion seen between cone pulley and face plate.

There will thus be seen to be four arrangements of gearing, first through the gears on the cone and main spindles, giving the latter the full cone speed, second through these gears and the back gears, third through the face plate gear with the back gear out, and fourth through the face plate gear with the back gear in. As the cone will be seen to have five steps, it follows that, in all, twenty speeds are provided.

The lathe is made of both 64-inch and 72-inch swing, which are sufficient for most locomotive driving wheels, and the full complement of speeds is intended to fit it more especially for railroad repair-shop use.

### Gold Coinage for Costa Rica.

THE Government of the United States has undertaken, on behalf of the Government of Costa Rica, the coinage of 600,000 colons of gold coin under the new gold standard that the Costa Rica Government has adopted. Preparations for the work are now being made at the Philadelphia mint, where the bulk of the coinage will be done, and artisans in the mint are engaged upon the dies and will be ready to strike the blanks some time next week. With the exception of running the pieces through the coin press all the work of coinage will be done at the Philadelphia mint.

The Costa Ricans have now established a mint in their own country, and have it equipped with two presses. They are not yet prepared, however, to make the dies, stamps, etc., necessary to do the whole work. The coinage of Costa Rica has heretofore been done in London and Paris, with the exception of the last issue, which was struck off in Philadelphia. The officials were so much pleased with that work that this contract was sent here. The Costa Rican colon is equivalent to 46 cents in United States currency and this 600,000 colons will be coined in 20-colon pieces, corresponding very nearly to the \$10 gold piece of this country. The Government of that country is trying to secure

gold bars sufficient to coin an additional 400,000 colons. Their money is coined on a ratio of 32 to 1, as between gold and silver, and it is said that the Bank of Costa Rica sold its supply of silver before the recent decline in price and made a considerable amount by the operation. Within ten days the work in this mint will be completed and the new coin will be sent to Costa Rica to have the finishing touches put on in the new mint.

### Telegraphing to a Moving Train.

IT is reported that George V. Trott, formerly a telegraph operator, of Chicago, has solved the problem of communicating by telegraph with a moving train anywhere on the line. Two insulated metallic tracks are laid between and parallel to the traction rails. They are not connected, and at intervals, equal in length to the circuit it is desired to establish, are discontinuous and separated by a non-conducting cushion. A trolley mechanism consisting of three pairs of wheels connected in multiple by "knuckle" joints and hinged to the foot-board of the engine runs under the tender on the inner rails.

The contact of the metallic wheels with the metallic rails closes the circuit, as the wheels are joined by a metallic framework. Insulated wires conduct the current into the engine cab and by means of the bell cord into any part of the train where there is an instrument.

The device is an adaptation of the street railway trolley or third rail of the elevated railways. Every train on a road equipped with the trolley system would at all times be on a loop circuit extending to the next telegraph station ahead. To send messages further or receive them from other stations the operator at the proper station would only have to "cut in" by means of a "jackspring" on one of the regular telegraph wires. Mr. Trott's device is exclusively mechanical. It involves no new or untried principles, and will require no more power to operate it than the ordinary duplex-cell battery at the regular telegraph station.

### Chicago's Great Drawbridge.

THE most stupendous swing bridge in the world, it is announced, will be built by the Sanitary Trustees of the city of Chicago. The construction will be under the direction of the most eminent engineering skill, and will span the drainage canal at 31st street and Campbell avenue. The total length of the structure, as planned, will be 400 feet, and its width 120 feet. The centre columns will reach a height of 68 feet; headway under the bridge, 18 feet, and a depth of 24 feet of water in the channel. The bridge will be of steel, involving a weight of 7,000,000 pounds, and capable of supporting a trainload equal to the enormous weight of 8,000,000 pounds. Three railways, it is expected, will use this structure, crossing on eight tracks. The turntable will have a diameter of not less than 80 feet, and the bridge will be swung in one minute's time, probably by electric power.

### A Fast American Train.

A NEW record for fast continuous running has been made by the Empire State Express on the New York Central Railroad. On July 16th the train left Syracuse for Buffalo 23 minutes late, and made the distance of 149 miles between these points in 143 minutes; this time includes a stop of two minutes at Rochester, together with the various slow-ups that are necessary at all times. The average speed, therefore, from start to stop, was 62.5 miles per hour. The fastest time was made from the top of the hill west of Batavia to East Buffalo, which is 32 miles run, in 26 minutes, which is very close to 74 miles an hour. Such a speed for the long distance is unparalleled.

### American Railroads for Ecuador.

ARTICLES of incorporation were filed at the office of the Secretary of State, at Trenton, N. J., on September 7th last, for the Guayaquil and Quito Railroad Company. This company is capitalized at \$12,282,000, and is designed to construct and operate railroads in Ecuador, South America, for which franchises have been obtained and contracts made. The grant was made by the Assembly of Ecuador to Archer Harmon, of Louisville, and several American associates, who are the incorporators of the company. The incorporation fee amounted to \$2,456.

—The Southern Pacific Railroad Company has formally entered the field as a purchaser and consumer of California petroleum. It is reported that the management of that company has had seven locomotives changed to crude-oil burners within the week just closed, and that two purchases of oil in bulk have been made by that corporation, one of 10,000 barrels and the other of 20,000 barrels.

—The introduction of a new oarlock for boats is recorded by the Chicago Tribune as involving an additional extension of the ball-bearing system in minimizing friction. As described the rowlocks in this case are of brass, with three point ball bearing, case hardened steel working parts; they are furnished in either polished brass or nickel plated, as may be desired. These materials will not bend or spread, and so the oars will move in them always the same, and thus there can be no liability to uneven rowing on account of the locks being of different shapes and angles, as is not infrequently the case with compositions of a softer character. The statement is made that this ball-bearing rowlock affords an ease in rowing which is most remarkable.

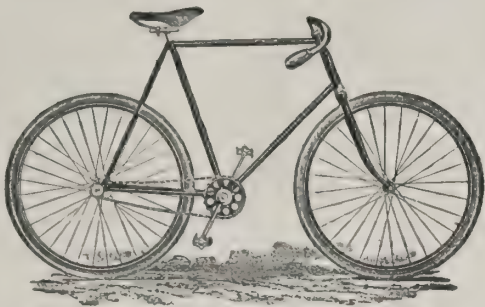


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Two Models, Ladies' and Gents'.

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## Harden's Latest for '97 The "Daisy" Baby Carrier

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NO. 14 A.

For an easy and comfortable Saddle, this beats any Saddle on the market. Handsomely padded and covered with the finest leather in either black or russet.

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The bottom of this seat is made of light material; the sides and back are of rattan, beautifully woven and mounted on a double steel wire spring clamped rigidly to handle bar post, with a movable foot rest. The seat is covered with a nice cushion, making a very beautiful and easy riding seat for a child. See this seat and you will have no other.

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Send for catalogue of Red Cross Specialties. Sample Tube by mail, 25 cents. Ask your dealer for it and take no other. Manufactured by

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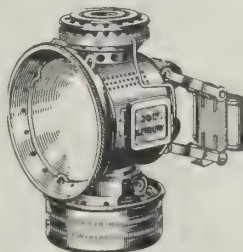
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## —THE— 20th Century Bicycle Headlight and Driving Lamp.

POPULAR ALL OVER THE WORLD.

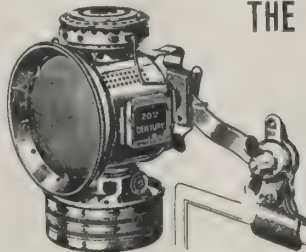
BICYCLE HEADLIGHT, with detachable Bicycle Holder, removed by simple pressure from the Lamp as well as from the wheel.

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STANDARD.		TANDEM.	
Nickel	\$3.00	Nickel	\$4.00
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## THE TANDEM SIZE AS A DRIVING LAMP,



with detachable carriage attachment, can be placed at any angle on dashboard or side irons of any vehicle. With the Bicycle and Carriage Holder detached and the ball handle raised the 20th Century makes a most excellent Hand Lantern for the house, barn, country road, camp, hunting and for boats. It may be used with colored front glass for developing photographs, etc. If not obtainable from dealers sent on receipt of price by



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## Miscellaneous Notes.

—The locomotive works at Dunkirk have just turned out a 20x24 ten-wheel passenger locomotive for the Mexico, Cuernavaca and Pacific Railroad.

—The English open fireplace yields a little to the American steam-heating apparatus that most Britons condemn, for \$3,200 worth of radiators were sent to London, along with \$500 worth of water meters. Water meters worth \$2,000 also went to Havre.

—A Memphis, Tenn., paper says the largest train of lumber ever shipped from the South was recently sent from that city to a couple of Western New York concerns. The train consisted of 37 cars loaded with over 400,000 feet of quartered oak. It required two large engines to haul the train out of Memphis.

—The best bicycle order that has been received from London for some time past was brought by Saturday's mail to a State street export firm for 1,500 complete wheels. This, for an independent order from the British market, is considered large. Most of the leading bicycle makers have agents in England to whom heavy consignments are made.

—The Jackson & Sharp Company has received the contract to build five first-class sleeping cars for the Argentine Great Western Railway Company, Limited, of South America. The cars will be partly according to the Pullman and partly on the Mann system, and will be 54 feet long, 10 feet 3 inches wide and arranged for a 5 feet 6 inch gauge.

—Numerous inquiries for radiators and hot-air furnaces from the British market have recently been received. The steamer Mohawk on her last sailing had on board nearly \$5,000 worth of radiators. Other good shipments by this steamer were upwards of \$4,000 worth of desks, more than \$9,000 in hardware, also \$4,000 in bicycles and \$7,460 in condensed milk.

—It is learned from good authority that before long the Japanese Government will contract for a large supply of swords, bayonets and other side arms to replace like weapons now fast become obsolete in the Japanese army and navy. It is also stated that, with a view of securing the contracts, certain very advantageous offers are being made by an American house; so favorable, in fact, that the order is confidently expected.

—Among the largest shipments recently made to Cape Town figure some heavy quantities of electrical machinery and supplies. The steamer Amana on her last sailing had on board upward of \$15,000 worth of this material. Other good shipments by the same vessel were these of cigarettes, which reached the value of \$13,000; iron pipe, \$8,000; steel bars, \$5,000; mining machinery, \$10,000; manufactured drugs, \$12,000, and furniture, upwards of \$6,000.

—Here are some curiosities of the export trade: "Missionary goods" to South Africa, British East Indies and Japan, \$2,000 worth in all; a \$425 trolley wagon to Bristol, Eng.; \$430 worth of mineral water to Belfast, "where the ginger ale comes from"; baby carriages to Brazil, \$46 worth; to Australia, \$1,610 worth; fire extinguishers to Africa, \$1,300; buggies to Boulogne, \$270, and to Hull, \$276; dental material and tooth powder to Chili; brewers' grain to Hamburg, \$7,468.

—Shipments to the United States of Colombia might be taken as a sample of trade with Latin America. Aside from foodstuffs, machinery, windmills, hardware, oils, etc., these articles are taken at random from a long list of exports: A grain mill, a tortilla mill, sewing machines (these go all over the world from New York), gold leaf, clocks, water coolers, valises, church goods, fuses, firearms, cartridges, dynamite, plated ware, lawn mowers, clothes wringers, books and candles.

—An American bridge company of Phoenixville, Pa., has been awarded the contract for railway bridges for the Ottawa & New York Railway Company over the St. Lawrence near Cornwall, Ont., over the Castor River, Ont., and over the La Petite Nation River, Ont. The first bridge has a cantilever span of 850 feet, a draw span of 277 feet, four fixed spans of 279 feet each, two girder spans of 60 feet and 450 feet of trestle. The other two are single span bridges of 116 and 150 feet respectively.

—The Briton may sneer at the American passion for ice and iced drinks, but his colonists know a good thing when they see it. Iced cream freezers were sent in the week to British Africa, \$90 worth, and Australia, \$25 worth. John Bull himself ordered \$115 worth for use at home, shipped to Liverpool. Freezers were also sent to Christiania, \$25 worth, and Hamburg, \$165. Refrigerators were exported in the same week as follows: Brazil, \$15; British West Indies, \$20; British Africa, \$149; British Guiana, \$15; Australia, \$92; Hayti, \$20.

—There are also some surprises in the list of goods sent direct to London from New York in one week. Among them are: Shoes, worth \$3,710; ink, \$4,930; stove polish, \$5,110; clocks, \$4,930; cabinets, \$120; varnish, \$630; wood-engraving machinery, \$200; baby carriages, \$13; electrical material, \$2,247; lawn mowers, \$25; phonographs, \$75; cart wheels, \$31; cuspids, \$263; cutlery, \$415; dental materials, \$67; cyclometers, \$20; photographers' materials, \$11,923; typewriter ribbons, \$1,500; other typewriter supplies, \$1,145; canned soups, \$411; whisky, \$3,506; shoe pegs, 99 barrels, and skewers, 65 barrels.

—Levi Houston, manufacturer of woodworking machinery, Montgomery, Pa., is making an automatic machine capable of mortising and boring blind stiles rapidly and in first class manner. The feed mechanism is positive and the machine will mortise and bore two stiles at one operation. The stiles being mortised and bored in pairs the change from mortising to boring can be made instantly. In mortising styles for long blinds without middle rail the mortise for the centre slat in stationary blinds is usually made  $\frac{3}{8}$  inch deeper than the others in order to pin the slat. This can be done instantly.

—Exports of carriages from the port of New York for month ending July 20th were: Argentine Republic, 52 carriages, \$3,100; Brazil, 64 packages wheels and axles, \$548; British possessions in Africa, 4 cases wagons, \$225; British West Indies, 7 wagons, \$610; 4 packages carts, \$192; Central America, wheels and axles, \$98; French West Indies, 98 packages material, \$104; Hamburg, 6 packages wheels, \$160; 24 boxes carriages, \$1,500; 1 carriage, \$507; 2 pairs wheels, \$102; Hull, 12 crates wheels, \$155; Mexico, 140 pair wheels and axles, \$1,820; 5 packages wagons, \$525; Peru, 3 packages carriage material, \$1,060.

—The Pan-American delegation which recently paid a visit to Chicago called upon a number of manufacturing concerns, each the representative of a particular industry. The importance of the bicycle industry in the West is shown by the statistics concerning the Monarch Cycle Manufacturing Company, which was the one called on. The floor space of that one factory covers an area of five acres. From 1,000 to 1,500 skilled mechanics are employed, and the daily output averages from 400 to 500 bicycles. The product of the same company during 1896 and 1897 was upwards of 40,000 machines. As a sign of improved and healthy condition of things preparations are being made to increase this output nearly 50 per cent. for the 1898 trade.

## Lord Kelvin Speaks of Niagara.

LORD KELVIN, the eminent electrician, who came to America to attend the recent meeting of the British Association at Toronto, was greatly impressed by what he saw at the Falls of Niagara, and was not scant in his praise of the civil and electrical engineers who so successfully planned and carried out the immense plant there for the development and transmission of electrical energy. His impressions regarding what he had seen will no doubt prove interesting.

"The Cataract Construction Company," said Lord Kelvin, "has entered on a project of arranging to develop 120,000 horse-power from the Falls, which is equal to the horse-power of four fast ocean liners. They have the prospect, in the near future, of developing 50,000 horse-power. The mechanism for advancing to that stage is already on the ground, and the excavation is being made in the rock for placing the requisite turbines. At present three turbines are in action which deliver 5,000 horse-power, and the result is most satisfactory. The electric design has been carried out with very great ability, and there is much to be viewed there that all the experts in electrical engineering who have the privilege of seeing will inspect with very much interest."

Referring to what effect this new development would have upon commerce, he continued:

"Already new factories have been brought to the town to take advantage of this undertaking. There is a paper factory that uses power, but not electrical transmission from the power-house, and four other factories are now at work. These are the aluminum factories of the Pittsburg Reduction Company, the Corundum Company, the Calcium Carbide Company and the Sodium Company. A fifth factory, that of the Electro-Chemical Company, for producing caustic soda, will shortly be completed.

"All these factories represent very important development, and there is every prospect of an industrial town growing up in that locality, its smokeless-factories doing their work by power transmitted electrically from the power-house. No doubt there will be a great expansion of work on the actual site of the Cataract Construction Company's present power-house on the United States side of the Niagara River, but in all probability there will be a corresponding development on the Canadian bank. I believe, in fact, that an industrial town will spring up on each side of the river, in which a great variety of industries will be operated by means of power supplied from the Falls.

"Besides this, we shall soon see electrical transmission to a distance. Factories in Buffalo will, ere long, be taking power from the present power-house at Niagara, and arrangements are almost complete for supplying it. A comparatively small amount of horse-power is now supplied to Buffalo, and is being used in that part of the tramway next to the city. But the project is to supply power not only for the electric railways, but for industrial and electric-lighting purposes in Buffalo, and there is every prospect of economical transmission to a distance of twenty or thirty miles. When I say economical transmission I mean transmission with so little loss of power, and with appliances of such moderate cost, that what the user can afford to pay will bring a profit to the company for all the money spent on the work."

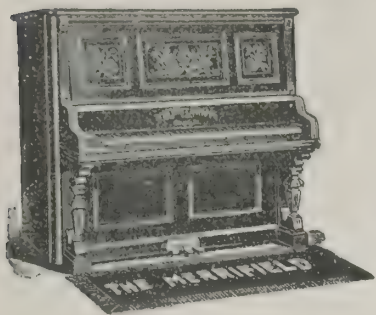
He was asked concerning his prophecy that the great Falls would in course of time disappear, or that all the water would pass through machinery to the level of Lake Ontario. He replied:

"Well, I distinctly say this—I do not believe the use of water-power from Niagara Falls will be limited to 450,000 horse-power, which is the amount for which the concession has been given to the company. In my opinion it will not stop at that; but as the demand goes on increasing so the amount of horse-power developed will increase, until the whole water-power of Niagara will be used for doing mechanical work."

ACCORDING to all reports trade with France appears to be very encouraging. Exporters are of the opinion that considerable business will be done in the electrical line, owing in part to the great efforts American manufacturers are making to develop trade. Laundry machinery has already found its way in considerable quantities from America to France, and woodworking machinery of the latest type has been ordered for shipment this Fall. A prominent American shoe machinery manufacturing concern is said to be turning out upwards of \$40,000 worth of machinery for immediate shipment to the interior of France and that another lot will follow shortly afterwards.



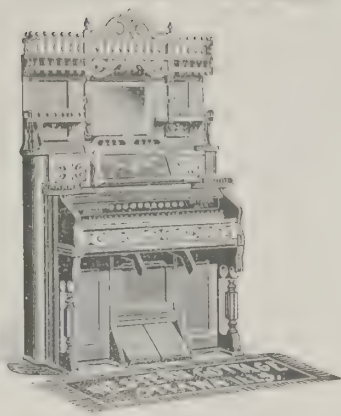
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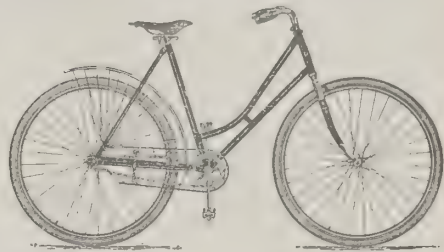


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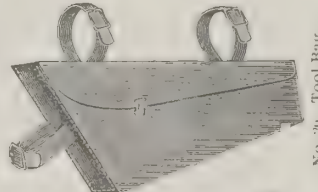
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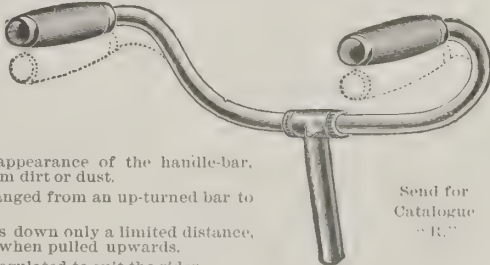
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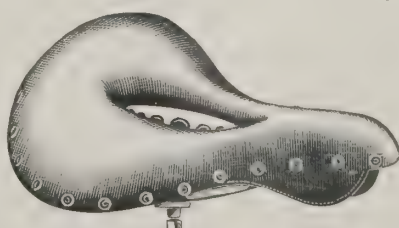


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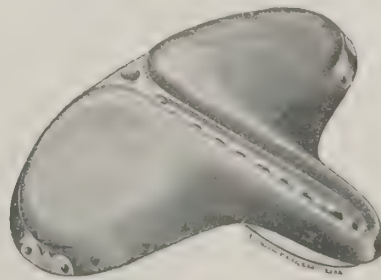
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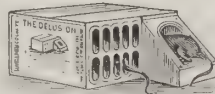
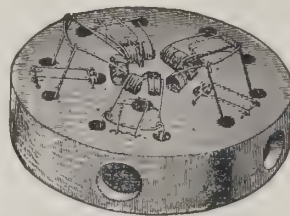
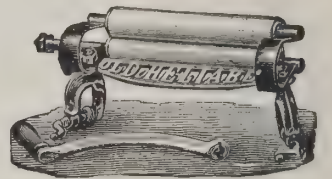
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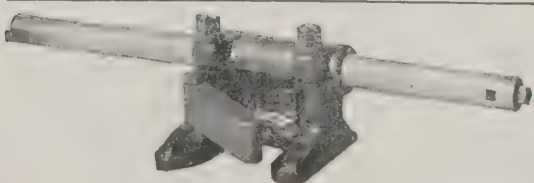
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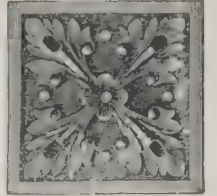
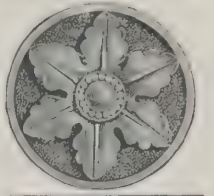
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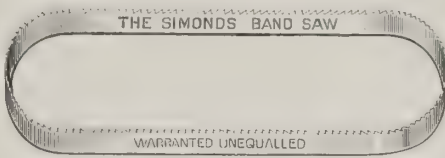
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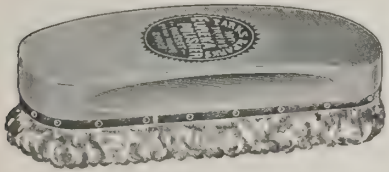
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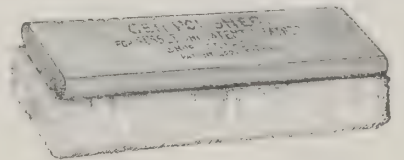
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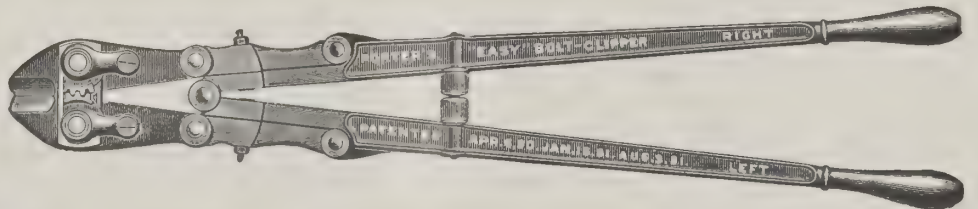
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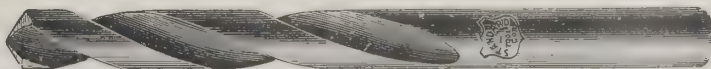
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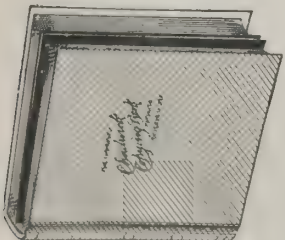
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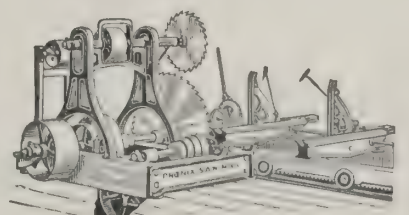
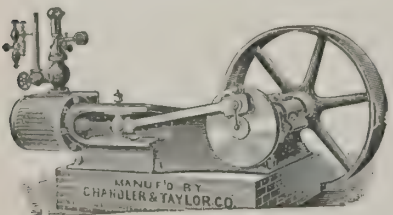
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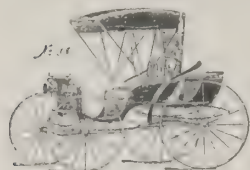
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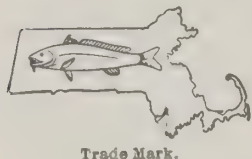
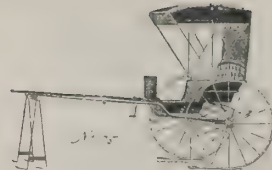
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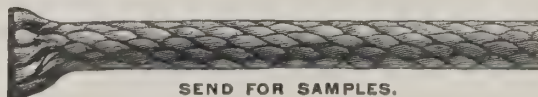


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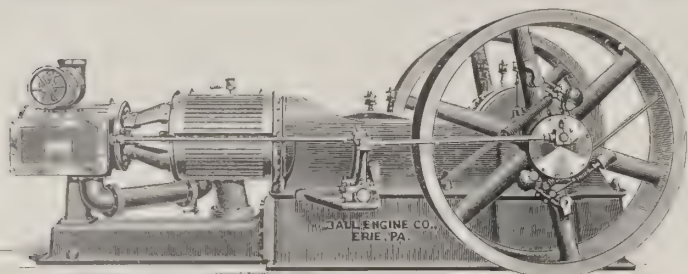
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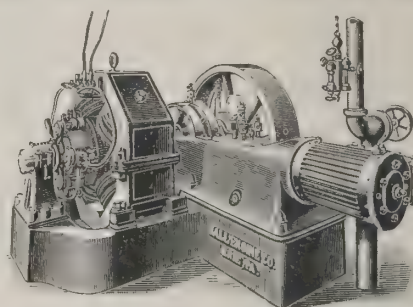
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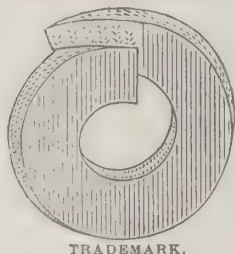
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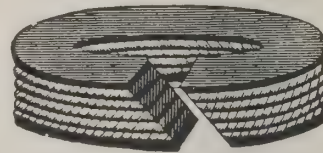
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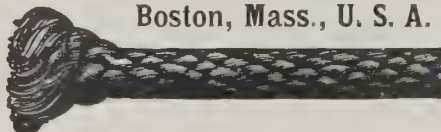
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**STEAM PACKINGS, SILVER LAKE & MILLER SOAPSTONE PACKING.**

Send for Samples.

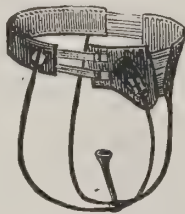
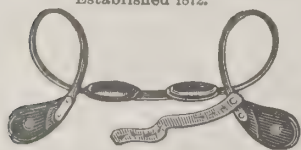
## THE HASTINGS & McINTOSH TRUSS CO.,

Established 1872.

Successors to

THE HASTINGS TRUSS CO.

224 SOUTH NINTH STREET,  
PHILADELPHIA, PA.,  
U. S. A.



Manufacturers of all kinds of Indestructible  
Hard Rubber, Elastic and Leather-Covered **TRUSSES,**

Abdominal and Uterine Supporters, Shoulder Braces, Crutches,  
Elastic Hosiery and Body Belts.

For Home and Export Trade.

Sole Makers of the CELEBRATED DR. McINTOSH NATURAL  
UTERINE SUPPORTERS.

We solicit orders through export commission houses.  
Send for Catalogue and Price Lists.



## RANDALL'S

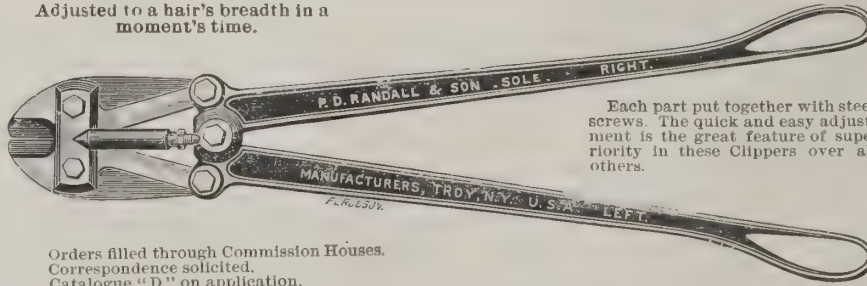
## NEW VALVE ADJUSTING BOLT CLIPPERS.

No weak spots in the whole Clipper. Knives tempered in the most careful manner. Every Clipper thoroughly tested before it leaves our factory. No. 3 cuts  $\frac{3}{8}$  inch or less; No. 4,  $\frac{1}{2}$  inch or less; No. 5,  $\frac{3}{4}$  inch or less.

ADDRESS

**P. D. RANDALL & SON, - Troy, N. Y., U. S. A.**

Adjusted to a hair's breadth in a  
moment's time.



Each part put together with steel  
screws. The quick and easy adjust-  
ment is the great feature of superi-  
ority in these Clippers over all  
others.

Orders filled through Commission Houses.  
Correspondence solicited.  
Catalogue "D" on application.

## S. PORTER & CO.

Manufacturers and Exporters of a

Full Line of Men's,

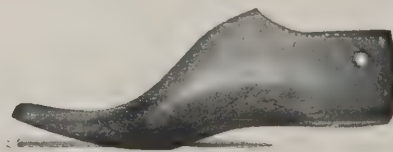
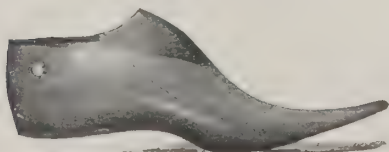
Women's and Children's

## LASTS.

Orders filled through Commission Houses.

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NEWARK, J. WISS &amp; SONS,

N. J.,  
U. S. A.Manufacture the Largest Assortment of ONLY THE  
BEST QUALITY

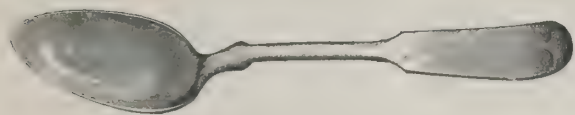
Shears AND Scissors,

STRAIGHT AND BENT TRIMMERS,  
TAILOR SHEARS, BARBERS' SHEARS, TIN OR METAL  
SNIPS, PRUNING SHEARS, LADIES' SCISSORS,  
PAPER AND BANKERS' SHEARS, ETC., ETC.Send for Illustrated Catalogue "E," and when ordering through Commission  
Houses, kindly send us a duplicate of order.

Established 45 Years.



## HIGHEST GRADE OF SPOONS AND FORKS.



TIPPED TEA SPOON, HALF SIZE.

The above cut represent our  
INLAID SILVER BEFORE PLATING.

RIALTO TEA SPOON, HALF SIZE.

Send for Illustrated Catalogue and Price List. Made only by

THE HOLMES &amp; EDWARDS SILVER CO., Bridgeport, Conn., U. S. A.

NEW YORK SALESROOM, - - 2 MAIDEN LANE.

Wholesale  
Manufacturers of

THE INITIAL TOE PAD COMPANY,

THREE RIVERS, MICH., U. S. A.

Buggy and Carriage Tops, Cushions, Backs, Toe Pads  
(Panel Protectors), Storm Aprons, Boots and Carpets.

"Best Value for the Money"

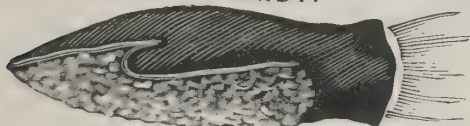
OUR MOTTO.

Give us, through your exporter, a trial order, and send duplicate order  
to us. We guarantee to please you. Catalogue and price list  
upon application.Highest Award,  
WORLD'S COLUMBIAN EXPOSITION,  
FOR

SHOE DRESSINGS.

ECLIPSE CEMENT & BLACKING CO.  
Philadelphia, Pa., U. S. A.

THE HANDY.



TRADEMARK.

SHEEP SKIN MITTEN,

Acknowledged to be the best article for POLISHING STOVES, as it does away with the old-time  
dirtiness of the work, making this work a pleasure. Also invaluable for polishing brass or glass, or  
silverware which it does not scratch. For tan shoes and cleaning bicycles it has demonstrated itself  
a conspicuous success

620 Atlantic Ave., Boston, Mass., U. S. A.

DIAMOND HARDWARE CO.

## STRANGE FORGED DRILL AND TOOL COMPANY,

Manufacturers and Exporters of

THE ONLY

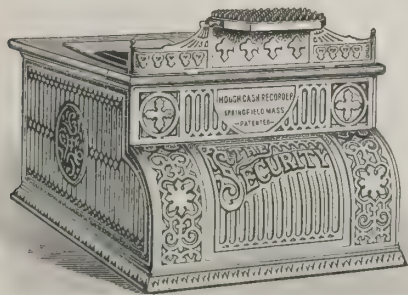
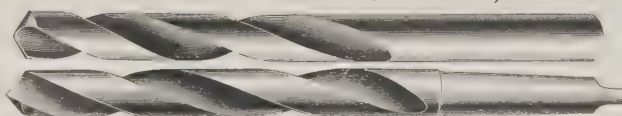
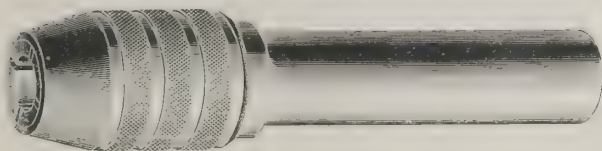
Forged Twist Drills

Made in the World.

Also Chucks, Rose Reamers and Machinists' Tools.

Orders filled through Commission Houses.

Correspondence solicited Catalogue "A" on application.



No. 100.

While Autographic Machines have been in use but a few years, nothing has ever been  
presented to the merchant that was so simple and practical as they are.However, until the "stop-action" of the "Security" was devised and patented, their  
accuracy was limited; oft-times an entry was forgotten and the cash over-ran when balancing,  
as it did previously when a counter book was used.This is overcome by using the "Security," as you cannot open the money drawer  
and forget to make a record that might want to be referred to at any future time.

We manufacture twelve different styles. Write for illustrated catalogue and price lists.

HOUGH CASH RECORDER CO., Indian Orchard, Mass., U. S. A.

Twist Drills made by this Company are HOT FORGED by an Entirely New Process.

Bit Stock Drills,  
Taper Shank Drills,  
1/8 inch " "  
3/16 inch " "  
Drills, fitting ratchets  
Etc.

They are TOUGHER and STRONGER than the OLD STYLE Milled Drills.

Catalogues sent free  
on  
Application.



# THE Smith Premier Typewriter

READILY ADAPTED  
FOR USE IN  
ANY LANGUAGE.

Popular at Home and Abroad

Most Durable Writing Machine  
Made.

Superior to All Others in Scien-  
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Best Value for Money Invested

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Constantly Increasing

"IMPROVEMENT THE ORDER OF THE AGE."



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**THE SMITH PREMIER TYPEWRITER CO.,**  
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Branch Offices in 42 Principal Cities in the United States and Foreign Countries.

ESTABLISHED IN 1836.

FOR THE PROTECTION OF TRADE.

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THE  
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Contain more than

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TERMS.—Subscription only, according to requirements.

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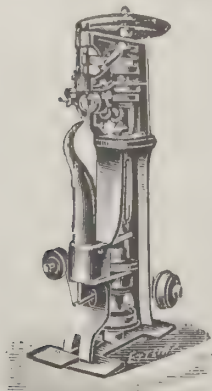
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FRANKFORT o/Main, GERMANY.

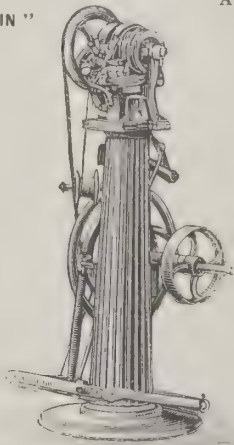
Telegraphic address:

"MOENUS, FRANKFORTMAIN"

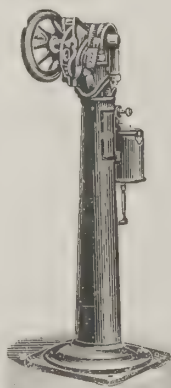
ABC Code and Staudt & Hundius  
Code used.



"Allianz" Lock-stitch Sole  
Sewing Machine No. 386.



"Albrecht" Lock-stitch Fair  
Stitching Machine No. 391.



Sewing Machine for Turned  
(Sew round) Work No. 392.

**SPECIALTY:** Machine and complete outfit for all Leather Trades for  
Boot and Shoe Factories, Shoe Upper Manufacturers, Tanners, Curriers,  
Belt Manufacturers, Army, Navy and Police Contractors, Saddlers, Har-  
ness Makers, Etc.

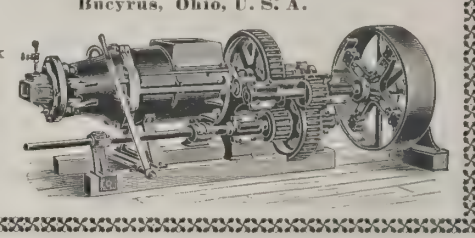
Catalogues in all modern languages, richly illustrated, and full particulars on application.



**SATISFACTION** is assured those who use our  
Clay-Working Machinery  
Send for estimate, catalogue, terms or any information free  
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Room  
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39 & 41  
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**Adjective:** Simple, powerful, accurate, economical.

**Objective:** Peerless Duplex Pipe-Threading Machinery.

**Promotive:** THE BIGNALL & KEELER MFG. CO.,  
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FOR

JEWELERS,  
SILVERSMITHS,  
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AND

SCIENTIFIC  
INSTRUMENT  
MAKERS.



Adapted to all purposes where accu-  
racy is required. In successful use en-  
graving jewelry, watch cases, silver-  
ware, thermometers, aluminum novel-  
ties, glassware, coffin plates, etc.

A Well-Built, Practical Machine.  
Built for Business. Very Easily Operated.

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**EATON & GLOVER,**

111 NASSAU ST., NEW YORK, U. S. A.

THE PARK & MCKAY CO.'S

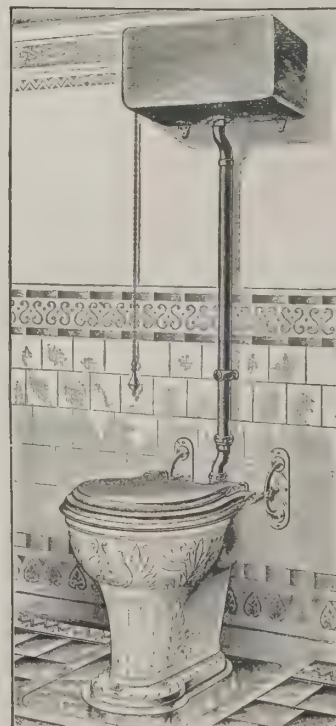
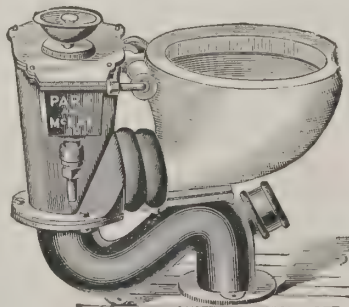
Double Trap,  
Siphon, Jet and Plunger

## CLOSETS.

EVERY CLOSET GUARANTEED.

Write for prices and catalogues. Send du-  
plicate order to us when ordering through  
export commission houses.

59 BAGLEY AVE.,  
DETROIT, MICH. U. S. A.





Length of Pusher, 5½ feet.

more than two horses can pull.

Thousands in Use.

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MANUFACTURERS OF



FOR

CHATTANOOGA, TENN., U. S. A.

Correspondence solicited.

We manufacture

OF EVERY DESCRIPTION.

Get our prices before ordering.

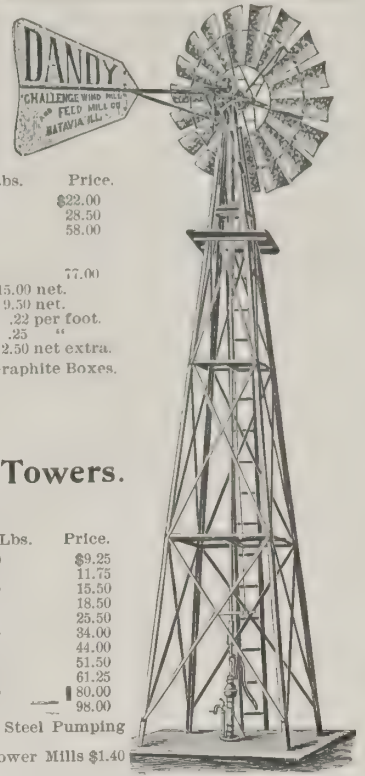
**THE POLSON IRON WORKS, Toronto, Canada.**

FOR 8 AND 10 FOOT PUMPING MILLS.

	PRICE LIST.	Net Weight, Lbs.	Price.
8-foot	for Pumping, geared back 2½ times.....	465	<b>\$22.00</b>
10 "	" " " " " 2¾ ....."	520	28.50
13 "	Special Mill for Irrigating Work.....	1,100	58.00
13 "	for Power Purposes, with upright Shafting for 50-foot tower and under, Foot Gears and one Pulley, and short piece Line Shaft.....	1,337	77.00
	Dandy Grinder for 13-foot Power Mill.....	\$15.00 net.	
	Pump Jack for 13-foot Power Mill.....	9.50 net.	
	¾ inch Cold Rolled Upright Shafting.....	.22 per foot.	
	1 " " " " Line .....	.25	
	Graphite Boxes for Dandy Pumping Mill...	2.50 net extra.	
	Prices on 13-foot Dandy Power Mill include Graphite Boxes.		

	PRICE LIST.	Net Weight, Lbs.	Price.
15-foot Dandy Steel Towers and Anchors.....		300	\$9.25
20    "                  "                  "                  " .....		375	11.75
25    "                  "                  "                  " .....		480	15.50
30    "                  "                  "                  " .....		557	18.50
40    "                  "                  "                  " .....		746	25.50
50    "                  "                  "                  " .....		1,100	34.00
60    "                  "                  "                  " .....		1,400	44.00
70    "                  "                  "                  " .....		1,700	51.50
80    "                  "                  "                  " .....		2,200	61.25
90    "                  "                  "                  " .....		2,700	80.00
100   "                 "                 "                 " .....		3,250	98.00

For prices of Galvanized Towers for 13-foot Dandy Steel Pumping Mills add one-half to above prices.  
Galvanized Steel Towers for 13-foot Dandy Steel Power Mills \$1.40 per foot net.



PRICE LIST.

Challenge Improved Iron Frame Medium Grinder.....	\$16.00
Challenge Improved Iron Frame Warehouse Grinder.....	18.00

Above Medium and Warehouse Mills are to be run by belt. For Geared Mills to be run direct from Tumbling Rod add \$3.50 net.

Warehouse Mills have 7-inch Grinding Rings.  
Medium Mills have 5-inch Grinding Rings.

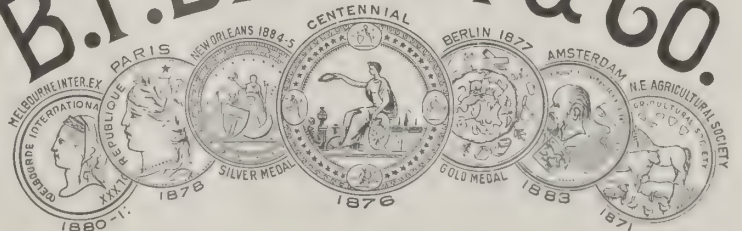
The above prices are for goods delivered on board ship at New York boxed and packed securely for foreign shipment.

TERMS: Net cash on delivery of goods at New York City.

# Challenge Wind Mill & Feed Mill Co.

Batavia, Ill., U. S. A.

# B.F. BROWN & CO.



**Manufacturers of the Celebrated**

AND

FOIR

**LADIES' AND CHILDREN'S  
BOOTS AND SHOES.**

MANUFACTURERS OF

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### LUNKENHEIMER'S Superior Specialties:

VALVES, LUBRICATORS, GLASS CUPS, GREASE CUPS,  
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Are the only goods of their kind made having an international reputation for superior metal, design, construction, etc., and are always used where the best is wanted. Our catalogue, replete with one thousand and one specialties for steam, water, gas, oils, etc., free upon request. Export Commission Houses supply Lunkenheim Specialties when specified.

**THE LUNKENHEIMER CO.,** Sole Manufacturers,  
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Branches: 26 Cortlandt Street, New York; 35 Great Dover St., London, S. E.

## IMPROVED RIVAL PAPER CUTTER



THE RIVAL is not a competitor of the so-called "cheap" paper cutters in the market. It is guaranteed equal to the best lever cutter made as to strength, ease in cutting, durability, etc., though its price is moderate.

Its leverage is obtained by the novel arrangement of a disk, surrounded by anti-friction steel rollers, secured to the end of the lever shaft. The effect of this device is to make the cutting uniformly easy—as easy as the commencement of a four-inch cut when the lever is upright, as on a one-inch cut when the lever is nearly down to horizontal position. No one who has ever used a lever cutter can fail to see the advantage this gives the RIVAL over its competitors.

Following are the sizes and net prices F. O. B. cars, New York City:

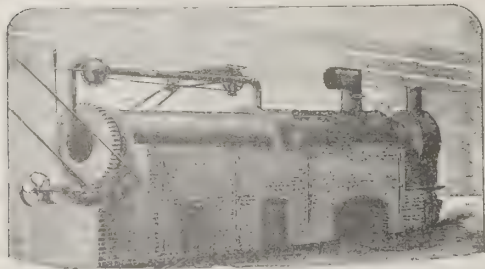
18-inch.....	\$ 55	30-inch.....	\$115
21-inch.....	80	33-inch, extra	
25-inch.....	85	heavy.....	160

The cutter is also furnished with a finger gauge for cutting stock within half an inch of the knife, without extra charge. The capacity of each cutter is one-fourth of an inch larger than stated above. Each cutter is provided with a regular back gauge of sufficient length to enable small work to be squared with both back and side gauges. Write for circular and prices of the Rival Power Paper Cutter. Order through any reliable commission house; always send duplicate of order to us.

## THE LATHAM MACHINERY CO.

Sole Manufacturers.

197-201 S. Canal St., CHICAGO, ILL., U. S. A.



## JNO. B. ADT

BALTIMORE, MD.,  
U. S. A.

Manufacturer of all kinds of

Patent

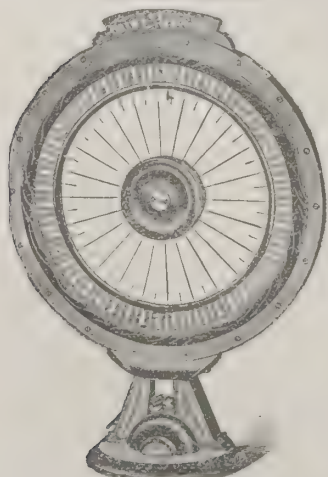
## Tobacco Machinery

New Furnace Dryer and Snuff Toaster.....	\$ 950.00 net.
Perfection Steam Dryer.....	920.00 "
" " " with Cooler.....	1,335.00 "
Tobacco Cutting Machine.....	1,050.00 "

FOR CIGARETTE, LONG, PLUG AND FLAKE CUT.

Tobacco Granulator No. 3 (Hand Power).....	\$160.00
" " No. 2.....	350.00
" " No. 2, with Separator.....	440.00
" " No. 1.....	560.00
" " No. 1, with Separator.....	660.00
" Packer (Power).....	300.00

BOXED AND DELIVERED IN NEW YORK.



Patented May 7, 1895.

## The Fairest Wheel

Is an invention for the use of dealers as an aid to an increase in sales of

**CIGARS, CONFECTIONERY,  
HARD AND SOFT DRINKS**

And ANY FIVE-CENT ARTICLE that can be sold  
SIX FOR A QUARTER.

The Fairest Wheel has increased sales double and as high as five times former sales. Over 15,000 in use.

AGENTS WANTED IN EVERY LOCALITY.

Write for price, descriptive circular and testimonials.  
Address

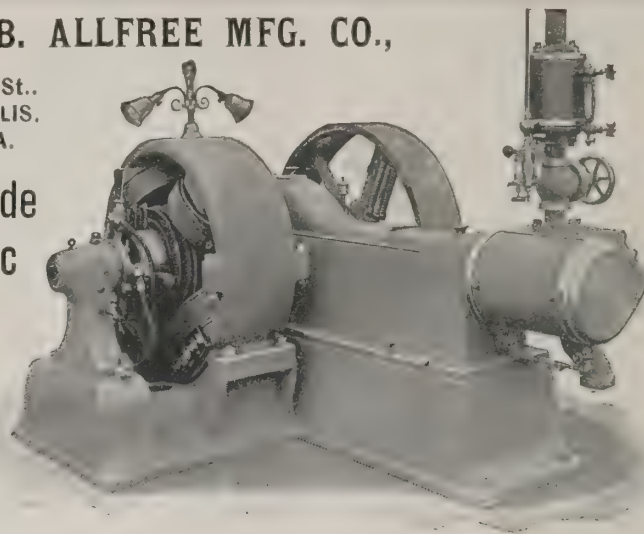
**DECATUR FAIREST WHEEL WORKS,  
DECATUR, ILL., U. S. A.**

This machine is fully covered by Letters Patent No. 538,916, and all infringements will be prosecuted to the fullest extent of the law.

## THE J. B. ALLFREE MFG. CO.,

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## High-Grade Automatic Engines.



Centre Crank and Side Crank; Slow, Medium and High Speed; Simple and Compound; Condensing and Non-Condensing. Direct Connected Dynamo Engines. Automatic Lubrication.

## H. G. SHELDON, FREMONT, OHIO U. S. A.

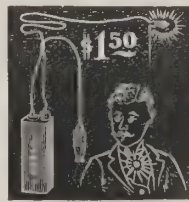
Proprietor of FREMONT DROP FORGE WORKS.



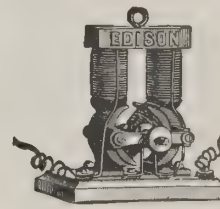
Shifting Rails of All Styles,  
Body Loops, Canopy Top Standards  
and Carriage Hardware, Dies  
and Special Drop Forgings made to order.

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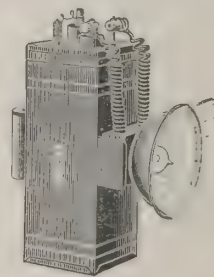
## The 3 Leading Electric Novelties.



Necktie Light.



Dollar Motor.



\$3 Bicycle Light.

We undersell all on everything Electrical.

## OHIO ELECTRIC WORKS

CLEVELAND, OHIO, U. S. A.

HEADQUARTERS FOR ELECTRICAL NOVELTIES.

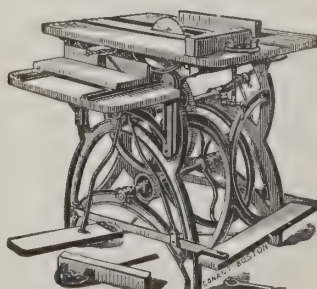
In ordering through export commission house send us duplicate order. Direct orders must be accompanied by draft on New York or San Francisco.

AGENTS WANTED.

CATALOGUES FREE.

## MARSTON'S FOOT AND HAND POWER SAW

FOR RIPPING, CUTTING OFF, GROOVING, RABBETING,  
CUTTING TENONS, MITERING OR BORING.



Weights 300 pounds. Gauges slide in planed iron grooves in top. Gears are all machine cut. Shaft and arbor are made of steel.

Price, - \$60.00.

With boring table and side treadle,  
\$67.00.

**JOHN M. MARSTON & CO., Boston, Mass., U. S. A.**



# The Chadwick Perfect Two Wheelers. SAW YOUR WOOD WITH THE FOLDING SAWING MACHINE

Newest, Most Perfect Driving Outfit Produced.

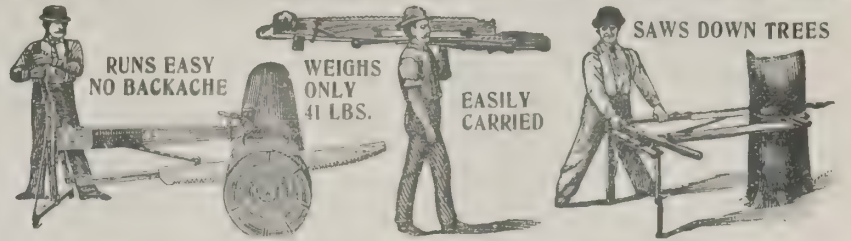


Safe, Convenient, Elegant Style and Fine Construction. Absolutely Free from Horse Motion and without Weight on Animal. Easiest Riding, Lightest Draft, Strongest and Most Durable One or Two Passenger Vehicle in the World.

THE ONLY TWO-WHEELER EVER PRODUCED PRACTICAL FOR USE WITH ONE OR TWO HORSES. POLE AND SHAFTS INTERCHANGEABLE.

PATENTEES AND EXCLUSIVE BUILDERS,

THE CHADWICK CO., Chadwicks, N. Y., U. S. A.



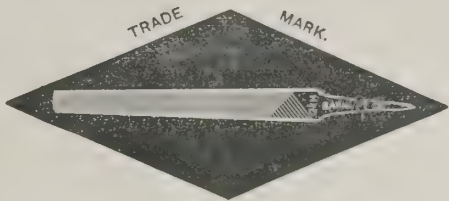
It saws down trees. Folds complete as a pocket knife. Weighs only 41 lbs. One man can carry it on his shoulder easily. It saws any kind of timber on any kind of ground. It is instantly adjusted to the ground and log so that the log is always cut square in two. It makes no difference how rough the ground is, and the operator never has to bend his back. 9 CORDS have been saved by one man in 10 HOURS. It is a great labor and money saver, as one man can saw more wood with it than two men can in any other way, and do the work a great deal easier. It is made in two sizes. No. 1 carries a saw 5½ or 6 feet long and saws any tree under 3 feet in diameter. No. 2 carries a saw 5½, 6, 6½ or 7 feet long and saws any tree under 5½ feet in diameter. Send for free illustrated catalogue showing latest improvements and complete description, and special prices in large lots. Net Price List, F. O. B. New York, Weights and Measurements.

One No. 1 machine .....	\$15 00 each;	Gross Weight, 84 lbs.;	Measurement, 5' 9" x 0' 10" x 0' 10"
One-half doz. No. 1 machines.....	13 00 " " "	370 " " "	5' 9" x 2' 6" x 1' 0"
One No. 2 machine.....	18 75 " " "	95 " " "	6' 0" x 2' 8" x 1' 0"
One-half doz. No. 2 machines.....	15 00 " " "	425 " " "	6' 0" x 3' 0" x 1' 6"

OF THEODORE CARR, 26 Lishmore Terrace, Carlisle, England, our Agent for Great Britain. FOLDING SAWING MACHINE CO., 64-66 S. Clinton St., Chicago, Ill., U. S. A.

## Black Diamond File Works

Twelve Medals of Award at International Expositions



Special Prize Gold Medal Atlanta, 1895

G. & H. BARNETT CO., Philadelphia, Pa.

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Grand Rapids, Mich., U. S. A.



Marine and Stationary Gas and Gasoline

## ENGINES AND LAUNCHES.

We manufacture Propeller, Side Wheel and Stern Wheel Launches. Send for Catalogue.

## SINTZ GAS ENGINE COMPANY,

GRAND RAPIDS, Michigan, U. S. A.



Manufacturers of  
Marine and  
Stationary  
Gas and Gasoline  
**ENGINES,**

## ALSO YACHTS AND LAUNCHES

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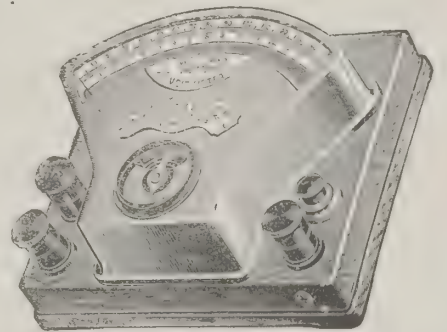
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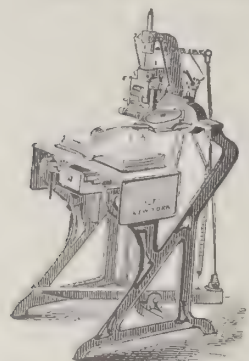
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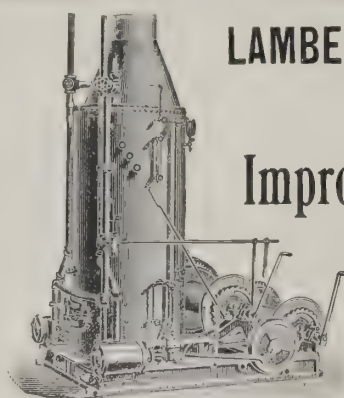
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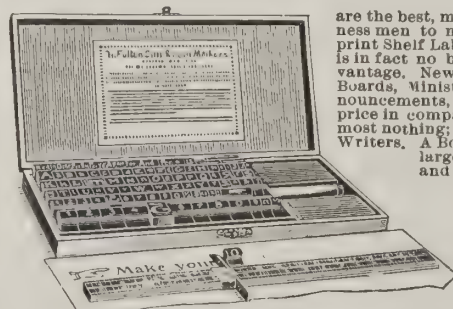
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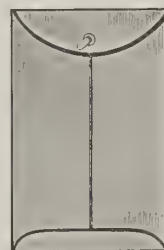
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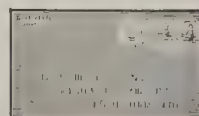
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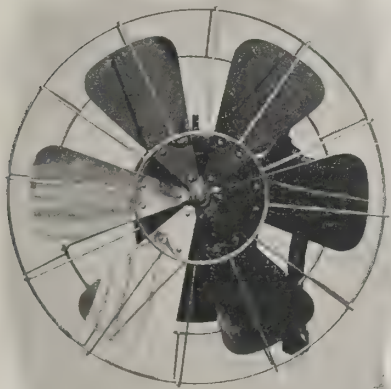
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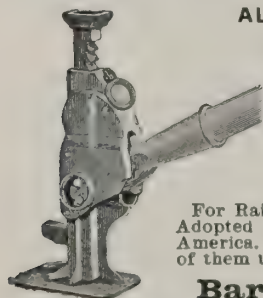
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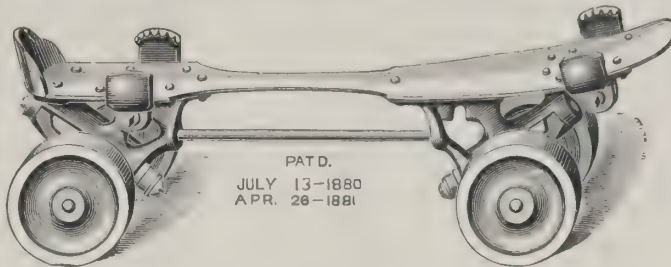


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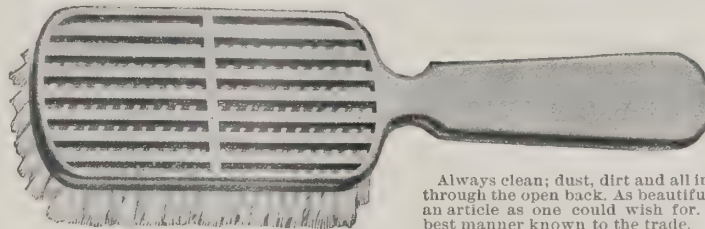
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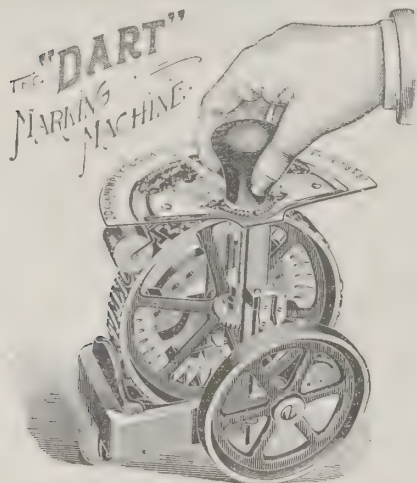


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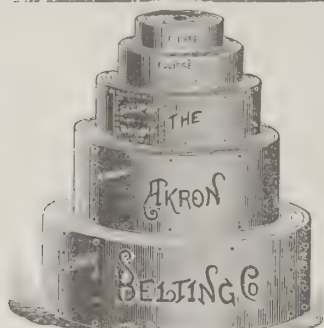
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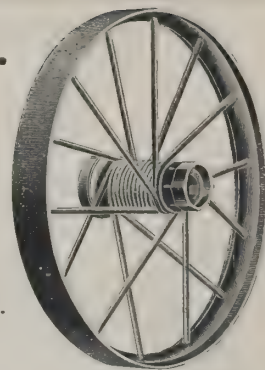
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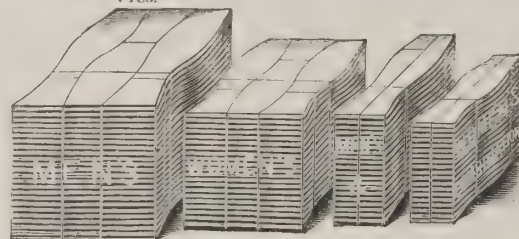
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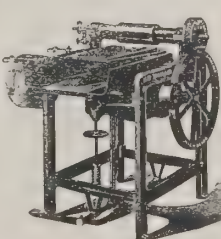
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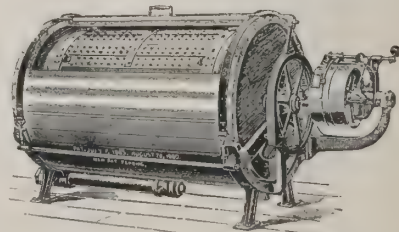
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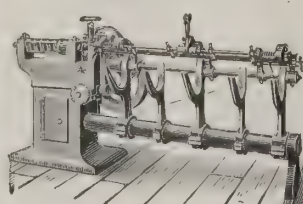


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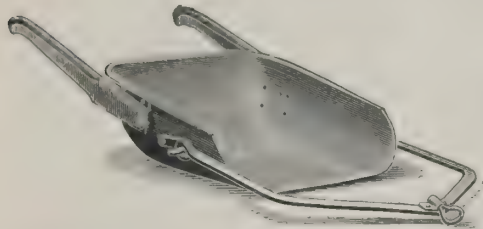
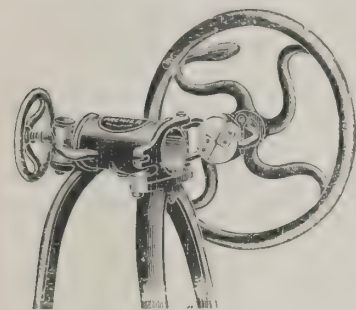
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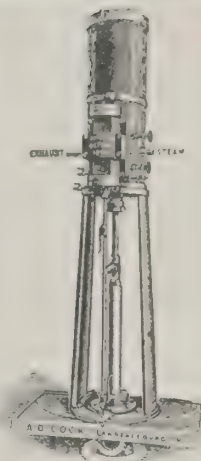
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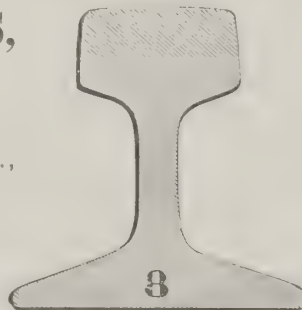
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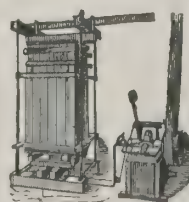
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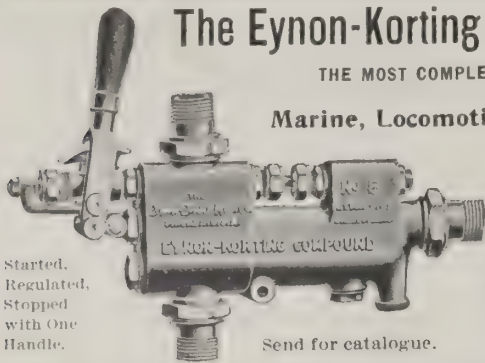
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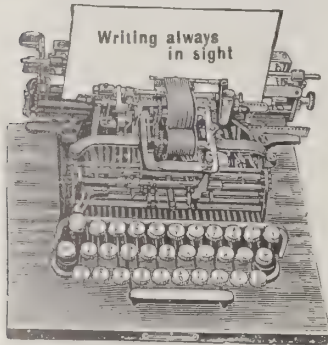
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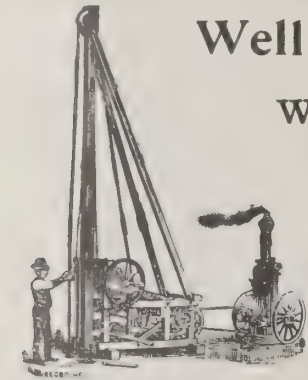
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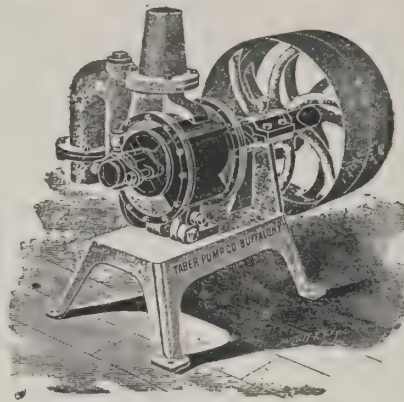
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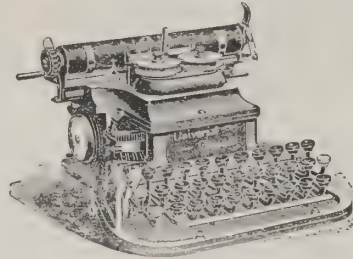
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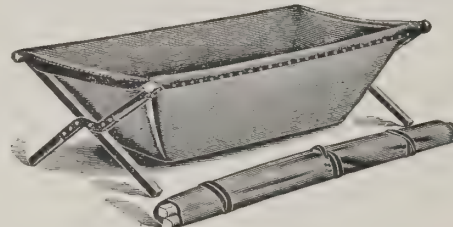
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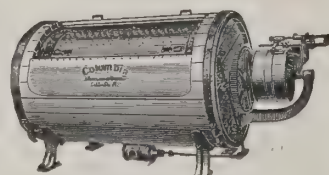
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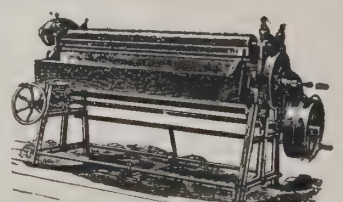
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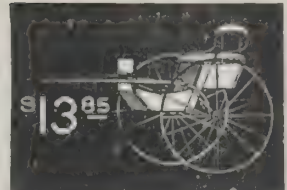






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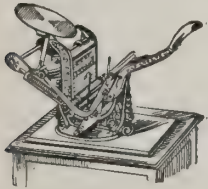
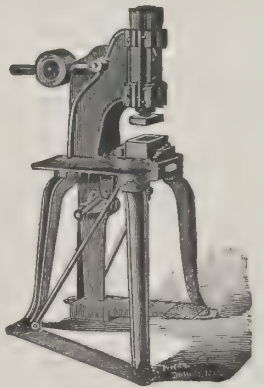
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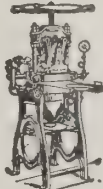
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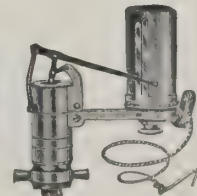
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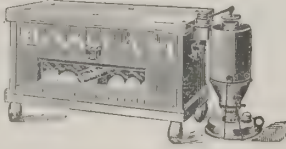
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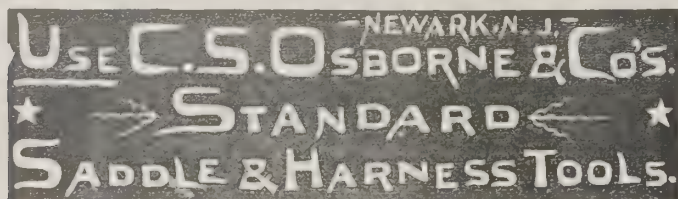
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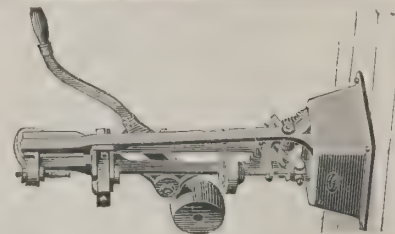
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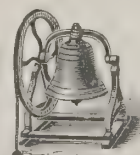
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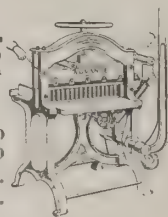
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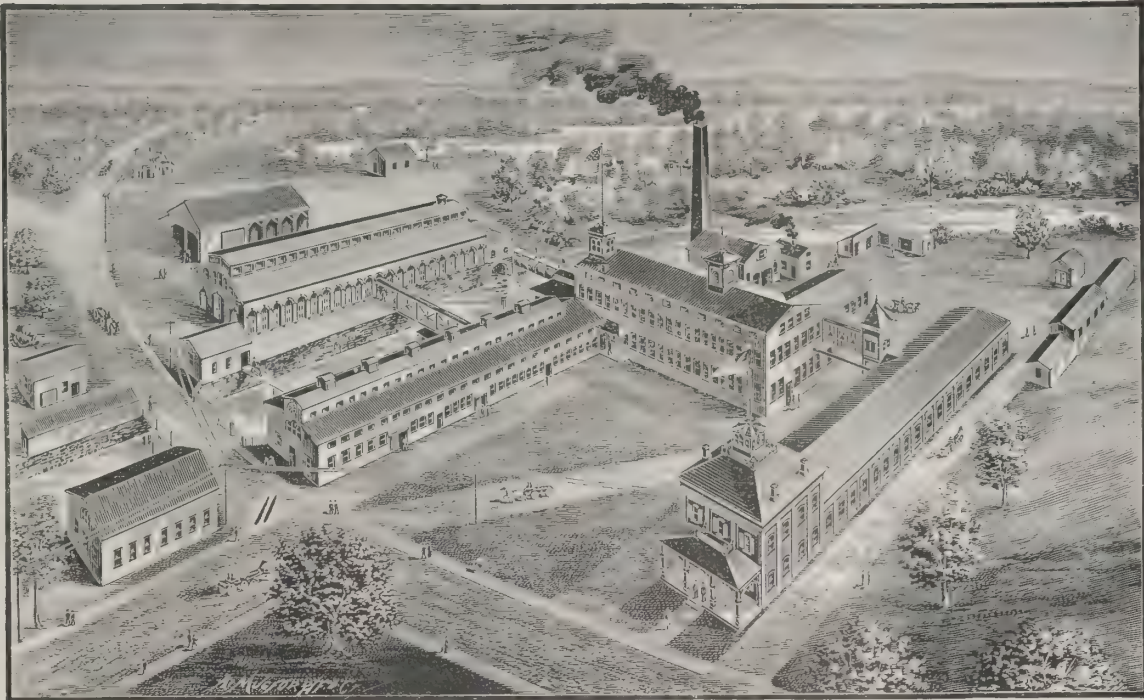


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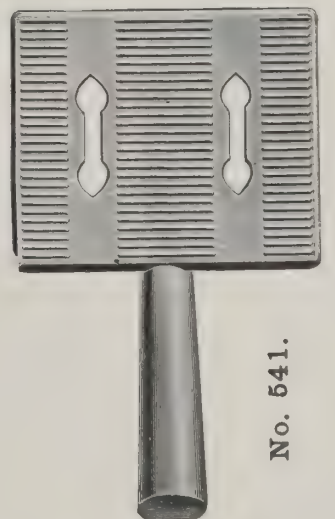
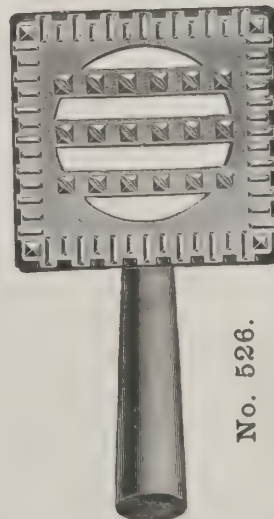
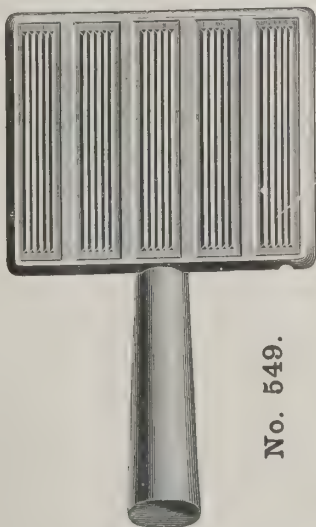
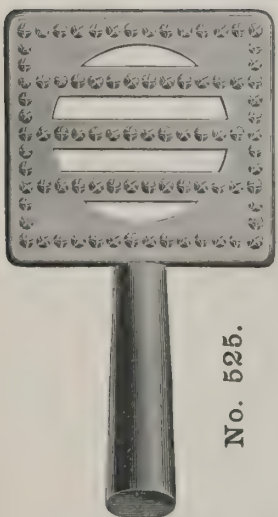
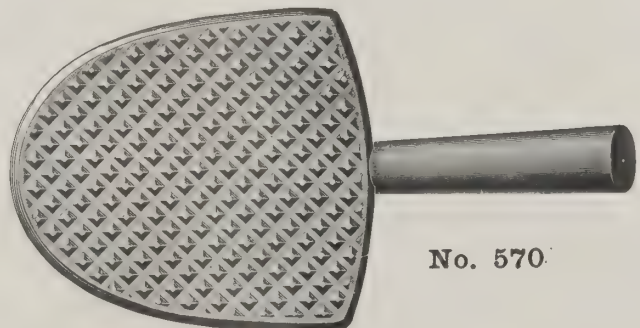
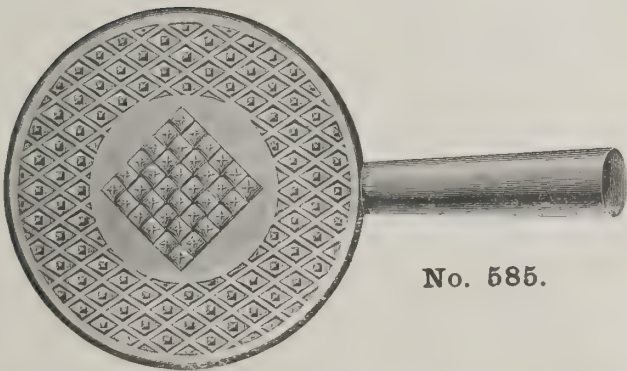
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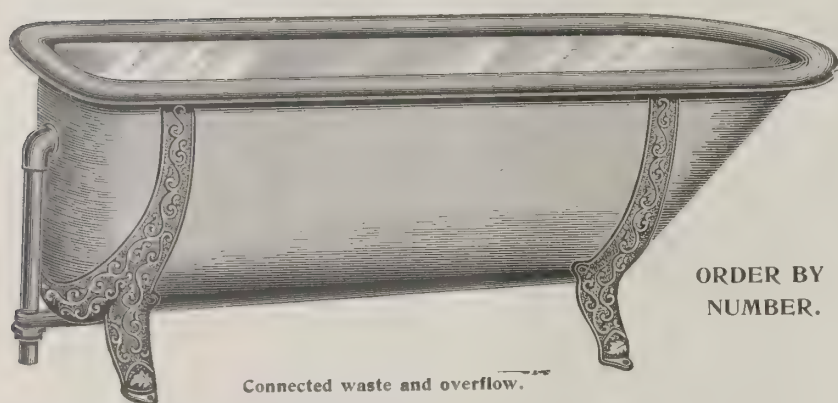
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Connected waste and overflow.

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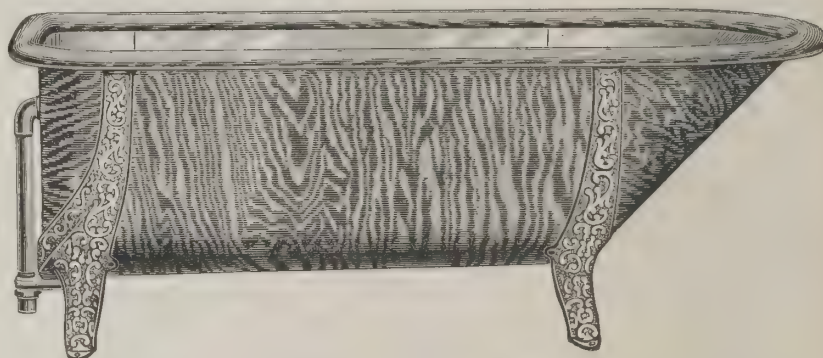
#### DIMENSIONS.

Length outside rim, 4 ft. 6 in.; 5 ft. and 5 ft. 6 in. Width outside rim, 28 inches. Depth inside,  $17\frac{1}{2}$  inches. Height from floor,  $23\frac{1}{2}$  inches.

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No. 38— 4 ft. 6 in., - - - -	\$12.00	\$13.00	\$14.00
No. 40— 5 ft., - - - -	12.75	13.75	14.75
No. 42— 5 ft. 6 in., - - - -	13.25	14.25	15.25
No. 44— 6 ft., - - - -	14.25	15.25	16.25

With connected waste and overflow same as cut.

### THE QUEEN.



Connected waste and overflow.

Oak, Cherry or Birch. Natural wood finish outside, nickel overflow, strainer, plug and coupling. Fitted for No.  $4\frac{1}{2}$  Fuller cock,  $3\frac{3}{4}$  centers unless otherwise ordered. Rim to match tub.

#### DIMENSIONS:

Length outside rim, 4 ft. 6 in.; 5 ft.; 5 ft. 6 in., and 6 ft. Width outside rim, 28 inches. Depth inside,  $17\frac{1}{2}$  inches. Height from floor,  $23\frac{1}{2}$  inches.

#### PRICE LIST.

	Copper, 12 oz.	14 oz.	16 oz.
No. 238— 4 ft. 6 in., - - - -	\$14.00	\$15.00	\$16.00
No. 240— 5 ft., - - - -	15.00	16.00	17.00
No. 242— 5 ft. 6 in., - - - -	16.00	17.00	18.00
No. 244— 6 ft., - - - -	17.00	18.00	19.00

With outside connected waste and overflow, add \$1.50 to list.  
With nickel plated legs, add \$4.00 to list.

### THE ECLIPSE.

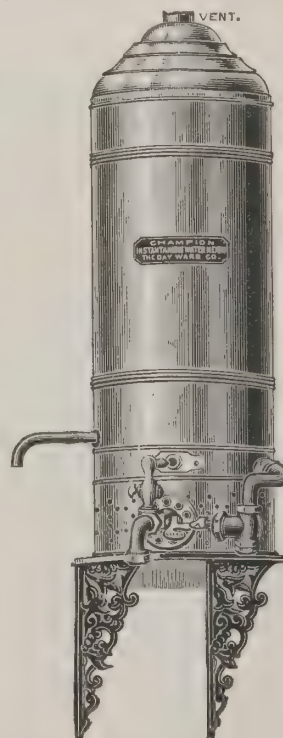


Connected waste and overflow.

This Bath is made to meet the demand for a cheap, sanitary Tub, and is of Galvanized Steel, Iron Legs, and covered inside with four coats White Enamel, baked on, giving a good finish.

The outside is painted light gray, and the legs are bronzed; the rim is wood; made in four sizes, and shipped with common overflow unless outside connected overflow is ordered.  $3\frac{3}{4}$ -inch centers. They are neat, clean, durable and cheap.

	Common Overflow.	Connected Waste and Overflow.
4 ft. 6 in., - - - -	\$9.00	\$9.50
5 ft., - - - -	9.00	9.50
5 ft. 6 in., - - - -	9.50	10.00
6 ft., - - - -	9.50	10.00



We believe this to be the

## Most Modern and Practical Water Heater

ever made and challenge  
comparison with any  
Heater on the market.

- 1.—Made entirely of copper, tinned wherever water comes in contact. Brass fittings will not RUST or CORRODE.
- 2.—SIMPLE IN CONSTRUCTION, nothing to get out of order.
- 3.—Occupies LESS ROOM than any other.
- 4.—Heats water INSTANTLY.
- 5.—MORE and HOTTER water than any other.
- 6.—Interlocking valves, EASILY OPERATED.
- 7.—Will heat sufficient water for bath in TEN MINUTES.
- 8.—Economical; uses LESS GAS THAN ANY OTHER.
- 9.—Gives PURE WATER; products of combustion do not come in CONTACT with WATER.
- 10.—THE CHEAPEST AND BEST.

#### PRICE LIST.

Copper, including shelf and brackets, - - \$15.00  
Nickel, including shelf and brackets, - - 20.00

These prices are net F. O. B. New York. Boxing extra at cost. In ordering through export commission merchants send us duplicate orders.

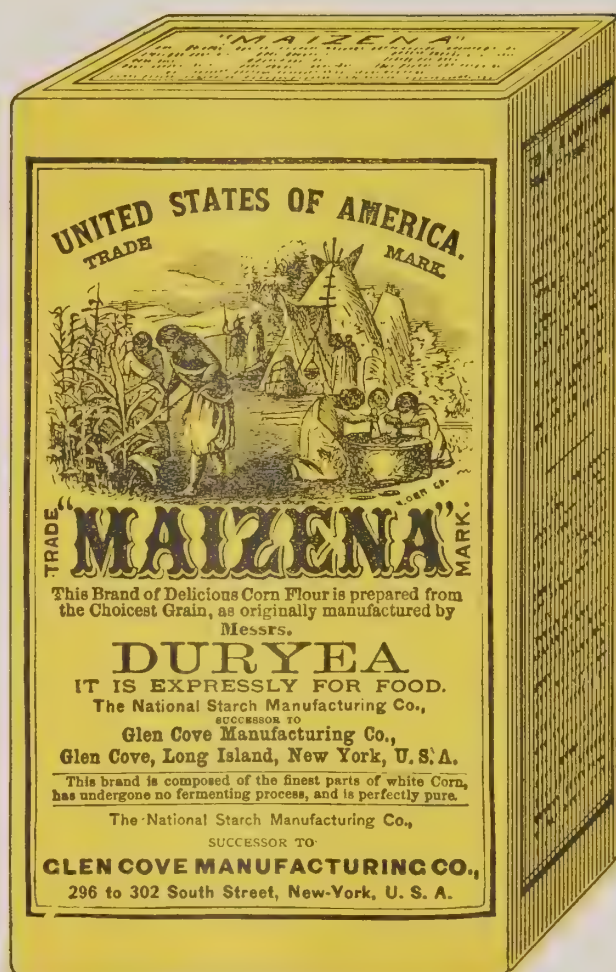
SEND FOR CATALOGUE OF FULL LINES MANUFACTURED BY

THE DAY-WARD CO., Warren, Ohio, U. S. A.



# TRADE "MAIZENA" MARK.

## (DURYEA)



A BRAND OF CORN FLOUR.

NUTRITIOUS.

DELICIOUS.

# ABSOLUTELY PURE.

A DELIGHTFUL TABLE DELICACY.

The above represents the Style of Packets in which "MAIZENA" is put up. Each Packet has recipes for its use on the wrapper.

(SEE OTHER SIDE.)



# TRADE "MAIZENA" MARK.

## (DURYEA)

This Delicious Brand of Corn Flour surpasses in Delicacy and the Diversity in which it may be prepared into tempting dishes for the table all other preparations from Maize, or Indian Corn.

It is especially adapted to use in warm climates, being light and easily digested.

For **Blanc Mange, Ice Cream, Custards, Puddings**, as dessert and as an ingredient used in **Omelets, Soups, Gravies, Sauces, etc.**, it is **unequaled**.

"Maizena" has been in popular use over a great part of the civilized world for many years, and, as an evidence of its intrinsic and invaluable merits, has received awards and public testimonials as follows:

### MEDALS RECEIVED.

WORLD EXPOSITION,	LONDON,	.	.	1862
"	"	HAMBURG,	.	1863
"	"	PARIS,	.	1867
"	"	LONDON,	.	1867
"	"	BRUSSELS,	.	1876
CENTENNIAL	"	PHILADELPHIA,	.	1876
EXPOSITION,		PARIS,	.	1878
"		MATANZAS,	.	1881
"		MELBOURNE,	.	1888
"		PARIS,	.	1889

AND 20 MINOR EXHIBITIONS WHERE DISPLAYED.

### TESTIMONIALS RECEIVED.

AT LONDON EXPOSITION, 1862,	"Supremely Excellent."
AT BRUSSELS EXPOSITION, 1867,	"Notably Excellent."
AT PARIS EXPOSITION, 1867,	"Perfect Preparation."
AT PHILADELPHIA CENTENNIAL, 1876,	"Notably and Absolutely Pure."
AT PARIS EXPOSITION, 1878,	"The Best Product of Its Class."

ALSO AWARD AT  
THE COLUMBIAN EXPOSITION, CHICAGO, 1893.

NONE GENUINE WITHOUT "**DURYEA**" ON THE PACKET.

Is manufactured EXCLUSIVELY by

# THE NATIONAL STARCH MANUFACTURING CO.

SUCCESSORS TO  
GLEN COVE MFG. CO.

NEW YORK.

(SEE OTHER SIDE.)



ESTABLISHED 1889.

# The Columbia Incandescent Lamp Co., ST. LOUIS, MO., U. S. A.

Manufacturers of Strictly High-Grade

## INCANDESCENT LAMPS

Our product surpasses all others in maintenance of candle power and uniformity in consumption of energy. Owing to the high maintenance of candle power we specially request users to order lamps up to the maximum voltage at which they are to be operated. As the lamps do not grow yellow with age, they should not be operated at an excessive voltage.

We manufacture in all voltages ranging from 45 to 145 and from 200 to 250 volts.

Write direct to factory for catalogue, price list and other information.

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NEW YORK,

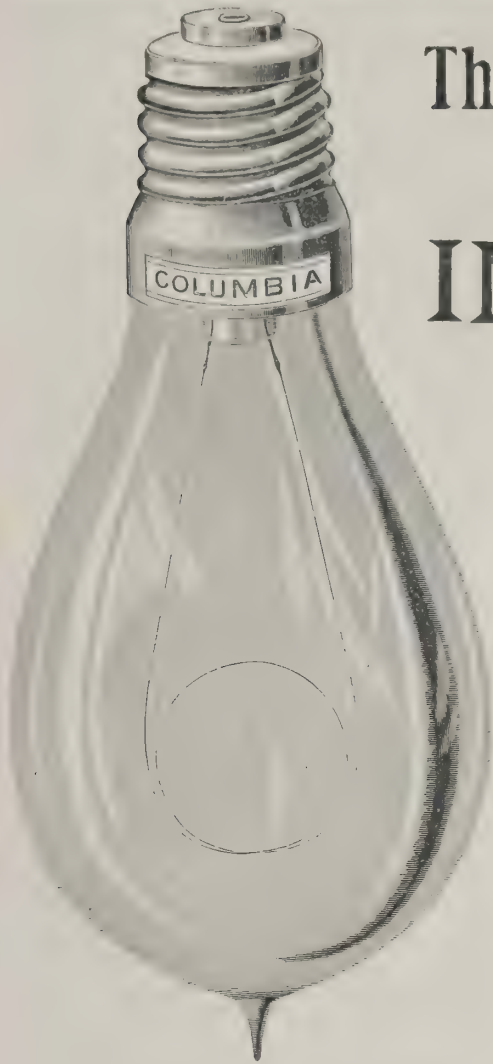
THE COLUMBIA INCANDESCENT LAMP CO.

Havemeyer Building.

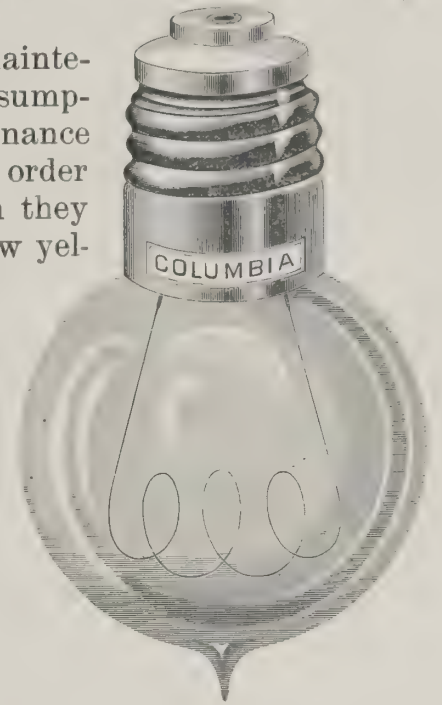
SAN FRANCISCO:

PAUL SEILER ELECTRICAL WORKS.

Mention this paper.



The above cut shows exact size of our regular Standard Lamp.



The above cut shows exact size of our round Bulb Lamp for decorative lighting.

In correspondence with us relative to prices please state the candle power and voltage of lamps desired and the style of socket they are intended to fit.

## If You Are in Doubt

IT IS BECAUSE YOU HAVE NEVER USED

# BROWN'S PAPERS

FOR YOUR BLANK BOOK WORK, ETC.

A trial will convince you that we have

### 1. The Best Ledger Paper

for your various account books.

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for draughting, drawing, water-color painting, "éditions de luxe," etc.

We can furnish you the above Papers at prices commensurate with first-class quality.



## L. L. BROWN PAPER CO.,

Adams, Mass., U. S. A.

We are now mailing our "Standard Ledger Diary for '97." Have you received a copy?

If not, write for one, mentioning this advertisement.



# DO YOUR OWN HARNESS MENDING WITH THOMSON'S SLOTTED CLINCH RIVETS.

The Only Rivet in the World that can be Set and Clinched with a Common Hammer.

For making attachments in the repair of Harnesses, Halters, Belts, Bags, Shoes and Straps, and other goods made of Leather, Rubber, Canvas, Felt, Pasteboard, Sheet-iron or Wood.

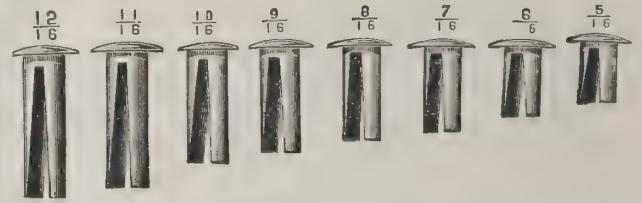
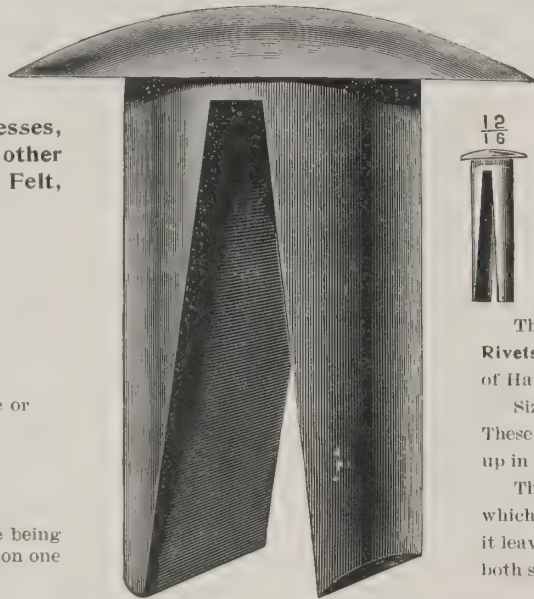


SECTION VIEW OF RIVET WHEN SET.

The only Clinch Rivet ever made that does not displace or weaken the material.

## THE HAND RIVET SET

is used as a convenience in holding the rivet while being set. It is made of steel, and holds the No. 6 Rivet on one end, the No. 9 at the other.



The above cut represents the exact size and lengths of No. 6 Rivets. They are used in the repair of Belts and all the heavy parts of Harnesses, etc.

Size No. 9 is smaller and in lengths runs from 3-16 to 8-16 in. These are used for all general repairs of Harness, Straps, etc. Put up in boxes in assorted or uniform lengths.

These Rivets require no hole before, nor burr after inserting, which can be done as easily and simply as the driving of a tack, and it leaves the goods in which the rivet is set perfectly smooth on both sides.

## THE HAND RIVET SET.



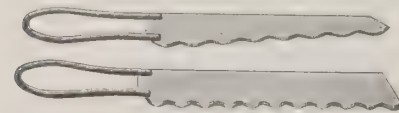
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JUDSON L. THOMSON MFG. CO., - Waltham, Mass., U. S. A.

# ILLINOIS CUTLERY CUTS!



No. 100. Crescent Knife Set, wire handles. Our knives are all finely ground and beautifully polished.



No. 300. Carving Set, wire handles. Can also furnish paring knife, same as shown in set above, if desired.

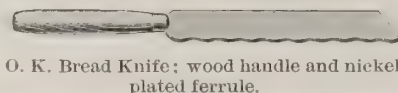


Famous Parer and Slicer. The best paring knife on earth; more sold than any other.

PAT. AUG 15, 1893



Combined Grater and Slicer. The slicer et is detachable. The grater is perfect.



O. K. Bread Knife: wood handle and nickel-plated ferrule.



ILLINOIS CUTLERY CO.  
DECATUR, ILL., U. S. A.

Manufacturers of Serrated Edge Knives  
and Hardware Specialties.

Cable Address: "ILLINOIS," DECATUR, ILL.



No. 1. Knife Set, malleable handles. They will stay on forever.



Standard Meat Tenderer. Does not pound the juice out of the meat. The blades are sharp. Finely nickel plated.



No. 50. Kitchen Set. One each: Meat Tenderer, Famous Parer and Bread Knife. Each set in elegant pasteboard box.



Illinois Can Opener. Simple, durable and convenient. No use paying high prices for a can opener.

## We have done no Export Business whatever,

Excepting to Great Britain, Germany, France, Russia, Austria, Australasia, South Africa, China, Japan, Hawaii, South American Republics, Klondyke Gold Fields, Canada, Mexico, Central America, Mediterranean Points, Cuba, Philippine Islands, India, Central America and a few other places, and are desirous of receiving orders from all countries not mentioned in this list, as well as increasing our volume of business where our goods are already introduced.



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We desire it distinctly understood by those who contemplate advertising in THE AMERICAN EXPORTER that space for advertising purposes is sold only upon the merits of the publication for that purpose. For this reason no advertising solicitor or agency has any right or authority to agree to give reading notices or to perform any special service whatever to obtain orders for advertising.

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## THE JOHN C. COCHRAN CO.

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# THE AMERICAN EXPORTER

(Founded by ROOT & TINKER, 1877),

AND

THE AMERICAN MAIL AND EXPORT JOURNAL

(Founded by HOWARD LOCKWOOD & Co., 1877).

THE JOHN C. COCHRAN COMPANY. - - - Publishers.

Bennett Building, New York.

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E. D. JACQUES, Sec.

CHARLES T. ROOT, Treas.  
WM. J. PERKINS, Asst Sec'y.

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## REVIEW OF SEPTEMBER.

WITH the advent of October trade conditions are most promising. The decided improvement in the business situation, which began in August, continued throughout September of the most satisfactory character. At no time has there been a feverish or unnatural activity in any channel. The tendency has been for a gradual and steady advance in each branch of our commercial interests, according to its seasonableness. For instance, July and August are notably quiet in almost all lines of business, yet a distinct increase in volume of trade during those two months was noticeable. Then, with September, the last of the markets and trades to benefit by the wave of prosperity showed a decided revival. The iron and steel trade, shoe and leather industry and the wool and wheat markets have evidenced a marked improvement.

There have been several potent and propitious factors which have brought about this condition of affairs. The first is the bounteous crop of wheat which our farmers have harvested, and the unusually good foreign demand therefor, prices ruling high, and all other agricultural products sharing in the rise to some extent. It is a law of trade that when the farmers prosper, sympathetically, all other industries share to an even greater extent the prosperity.

Another factor was the successful termination of the coal strike last month. Though it is more or less true that the prolongation of this great strike could not have materially retarded business improvement, nevertheless, it was like a taint in the lifeblood of trade, and increased confidence has resulted from its removal.

An unfortunate condition of affairs reigns in the South, but we do not believe the yellow fever is as serious as reports of daily papers have tried to make it appear. While there is a quarantine, and cessation of intercourse with the stricken district, which staggers internal and export trade from Southern ports, nevertheless, we are hopeful, and confidently predict, that the fever cannot become epidemic so as to cripple the people and render business recovery slow. Further, that the lifting of quarantine will see such activity and energy manifest as will insure speedy recovery from this slight setback.

The gold imports which began to arrive about the end of September were also a powerful stimulus to business confidence. The condition of trade is very healthy in both home and foreign markets, and promises a Fall and Winter of great activity in all lines.

## SCIENTIFIC CONSTRUCTION OF MACHINERY.

THERE was a time when most machinery was built on a haphazard plan of guess and try. But little drafting and designing were done, parts being formed according to the judgment of the constructing mechanic, who thought that such and such mechanical motions would accomplish the desired results, and who judged by the look of a piece of metal whether it was strong enough for the purpose to which he applied it. That day has gone by, and a manufacturer of machinery now could no more hope to make a success by such methods than a grocer could hope to satisfy his customers by guessing at the weights and measurements of all articles sold.

Following the guess stage came the drafting stage, which was a long step in advance. Now every maker of machinery felt obliged to have every part and piece carefully designed and drawn to scale, and studied with reference to improvement, before any attempt was made to manufacture. Tests were also undertaken so that parts formed of a definite size and material had a strength that was approximately known. Standard sizes of screws and bolts were introduced, and templates and jigs for securing the correct duplication of parts, so that when a breakdown of machinery occurred the broken parts could be replaced by others with a certainty that they would fit.

Such is the practice among numerous manufacturers of machinery at the present time. But what we call the scientific construction of machinery goes beyond this, and insures the making of a superior class of machines. The superintendents and head draftsmen in shops that manufacture machinery on a large scale are now college graduates and educated mechanical engineers. They have begun by obtaining a knowledge of the laws of physics and mechanics, and they keep posted with the world's progress in electricity, chemistry, and the various subdivisions of scientific research. They have the collated knowledge of the globe's most prominent engineers at their fingers' ends, and they put it into the machines they build. Formerly, when a machine was wanted for a certain purpose, a mechanic built one on the first practical lines that came into his head. Use served to show where the machine might be better, and it was changed, and changed, and improved, until finally it approached perfection, and a satisfactory type of machine was developed. The educated mechanical engineer now often produces the perfect machine at the very outset. With him there is no such thing as inventing. He simply knows all the mechanical motions, and calculates on the best combination for the purpose in hand. All the experimenting is done on paper, and nothing is guessed at or left to chance. Knowing just what may be expected of compressed air, or electricity, or of compression-springs, under certain circumstances, he simply selects that which is best for the purpose, and if any recent discovery in science is available, he makes use of that, and in this way is built a full-fledged and perfect machine, of known capacity and endurance, which may be duplicated indefinitely at moderate cost. An instance is the Emery testing-machine, which earned its designer a bonus of something like \$100,000 from the United States Government. A testing-machine was wanted that would crush and rend steel samples of enormous strength, without injury to the machine that did the work. It required several years of study on the part of Mr. A. H. Emery to produce just what was wanted, but he worked out the problem satisfactorily, and delivered a machine that would break a steel link requiring a pull of half a million pounds, and measure and record the breaking strain with absolute accuracy, and could be used the next minute to break a human hair, and record the minute strain, with no more injury to the machine than was caused by the first-named mighty rupture. This machine attracted the attention of numerous engineers, and the universal verdict was that it could not be improved—that nothing was left to be desired in such a machine. And this is only one instance out of many. There is hardly a line of trade in which the same thing has not been done, by the concentrating of modern scientific knowledge at the outset. It is this sort of intelligent work that is making the market abroad for American machinery.



### THE FOREIGN MARKETS.

THE most encouraging reports are being constantly received telling of the favorable reception of American manufactures at good prices in foreign markets. It is not enough that we invade the principal markets of the world, but we are constantly reaching out for those hitherto considered inaccessible. Especially are our manufacturers competing successfully with those chief markets where a superiority of native products was supposed to debar our so-called inferior goods.

In England our manufactures are in ever-increasing demand. In the matter of small tools and hardware, particularly builders' hardware, there is a growing demand which promises to create a permanent and most profitable market. American rails are being largely used, and there is a rumor that the London and North-western Railway is negotiating for 100,000 tons of steel rails from the United States.

The same condition exists also in Germany, which country presents excellent opportunities for the expansion of our foreign trade, though it is said that the German Government is much dissatisfied with our new tariff and intends to retaliate in some measure. American-made shoes, however, are finding a ready market in Germany which promises to assume most satisfactory proportions. Our iron and steel manufactures are also meeting with a great deal of favor in the same quarter.

Immense exports of American machinery have been made to Japan. Recently 1,600,000 pounds of paper-making machinery was shipped to that country, and railway supplies from the United States are also in great demand there. The Japanese Government is about to award the contract for the 180-mile Imperial Railway, and it is said that the 60-pound section rails known in this country as the Pennsylvania Railroad standard are to be adopted. The choice was made after a close and expert comparison with the English standard and all other standards on the principal roads in the United States. We have also supplied Japan with an immense number of locomotives, over 120 having been ordered and many delivered during the year.

Next to the South American Republics and Mexico, our best field for development is in the Orient. Japan has set the pace and undoubtedly China will fall in line. Indeed there is always a move in that direction. There are great possibilities in China for the expansion of our trade. An industrial wave of much significance is to sweep over China in the next ten years, and if our manufacturers would but realize it, and try to meet the demand by proper representation there, they could find a splendid market for all kinds of machinery, especially for railway equipments. Immense quantities of structural iron and steel will be required in China from now on. Our exports to this country show a very fair increase for the last fiscal year.

### OUR IRON AND STEEL TRADE.

THE director of an English railway recently said: "In the course of my duties I have had occasion to open tenders for the supply of steel girders for bridge work. I have received an American tender for the quantity required for the sum of £3,853 free on board at an American port. The lowest English tender was for a sum of £4,483 free on board at an English port. The difference in favor of the American tender is about 15 per cent."

It is such facts as these that readily explain the why and the wherefore of the increased exports of the products of our iron and steel industry. In 1895 our exports of these products amounted to \$35,000,000, and in 1896 to \$48,000,000, but it must also be borne in mind that the prices during 1896 were lower than at any period since the Civil War, No. 1 pig iron selling last year as low as \$11.75 a ton. The total production of pig iron in the United States for 1895 was 9,446,308 tons, in 1896 it was only 8,623,127 tons. The total production of steel for 1895 was 6,212,671 tons, for 1896, 5,600,000 tons. The United States leads at present as an iron producer, with Great Britain a close second, and Germany third.

France and Austria and other European countries also making splendid strides in this industry. The production of iron and steel is the greatest industry of civilization. One reason for our present supremacy is that we are the largest producers of iron ore in the world, and another is the great amount of building throughout the United States in which iron and steel is becoming a more and more important factor. Yet the main cause of our increase in business is, beyond question, in the fact that our manufacturers can produce a superior article and enter into competition with foreign producers offering in one instance, as above stated, a saving of 15 per cent.

### THE PANAMA AND NICARAGUA CANALS.

THERE has been a sensational rumor going the rounds of the daily press to the effect that the British Government had purchased from the French capitalists the Panama Canal franchise. The conservative and well-informed business men of the country doubtless accepted this statement for just what it was worth, and looked upon upon it as a catch-penny newspaper story.

It has been known for some time that the concession has been for sale, and the United States and other governments have had the opportunity of purchasing it and completing the work. It may be possible that an English syndicate has made this purchase, for the long-desired Panama Canal is still held by many experts to be a feasible project, but the assertion that the British Government had done so is without any foundation in fact. It is most likely that England is well aware of the treaty of 1846 between the United States and New Granada, now the United States of Colombia, which guarantees the absolute neutrality of the isthmus.

Whatever may be the outcome of the rumor, it is most likely to have a beneficial effect in causing the United States Government to use all expedient haste toward the construction of the Nicaragua Canal project, which is even a more desirable scheme than the Panama. It was a plank in the platform of the Republican party, adopted at St. Louis last year, that the Nicaragua Canal should be built, owned and operated by the United States. A commission for the further survey of the canal has already been appointed, and undoubtedly their report will be favorable and the undertaking will be pushed to completion by the present Administration.

It is to be hoped that such will be the case, as the importance of the Nicaragua Canal to the world's commerce is very great. As a waterway between the Atlantic and Pacific, under our control, it is also of the utmost importance to our own commercial interests. It will promote intercourse between eastern and western home sea-board ports, it will bring us into more direct inter-communication with South American states, and also with Europe, Asia, Africa and Australia, lessening the distance between the chief points of trade from 1,000 to 10,000 miles. It requires no argument to show how great an incentive our export trade would receive with the Nicaragua Canal an accomplished fact.

### DAIRY PRODUCTS FOR EXPORT.

SYSTEMATIC and well-directed efforts have been made by the Department of Agriculture to introduce our dairy products into English markets. They have not met with so many difficulties as were anticipated, and such as have been found will doubtless soon be remedied. The recent butter shipments, particularly, have met with a very encouraging share of success. The Department has been ably assisted in its work by several large producers, who have acted upon the reports and advice of the Department and consigned large shipments of butter to London, which has been disposed of at a good profit.

It is a noteworthy fact that in almost every instance where the butter has not been well received and sold to advantage it is because there has been a very decided variation in color, in flavor and in the shape and size in which it was put up, and not through any inferiority of the article.

The most successful results were obtained from the shipments of unsalted butter to the London markets. The demand for this



article is increasing in all the larger home markets and also throughout England and France. By means of the improved methods of refrigeration of perishable export products such unsalted butter sent from this country reached the retail dealers in England ten days after leaving the churn in the best of condition. It cost 2 1-2 cents per pound, by the ton, to ship this butter from Minnesota to London.

Another prominent Western dealer recently shipped to a London commission merchant several tons of unsalted butter, which was duly received and in a few days sold out at 21 cents and a fraction a pound. This is the highest price yet paid for States butter, and the same quality sold in New York at the time for 17 cents.

Great Britain buys about \$65,000,000 worth of butter annually. At present about 1 per cent. of this business is with United States exporters. There is a great future for our large surplus dairy products for export trade, not alone in England, but in other countries, and foreign importers will not be slow to realize the opportunities our markets will afford them to import high-grade dairy products and to take advantage of them.

There is one important point in connection with the success of this trade which importers and exporters alike should bear in mind. That is that, in some instances, where an imported article differs radically from that of home production, a prejudice, unreasonable perhaps, but none the less harmful, exists, and the effort should be to overcome this. In the making of some articles, and that under present discussion is one, it is just as easy to make it identical with that which is put up by home producers, and thus insure a competition upon the safest lines.

#### A NOTE OF WARNING.

PRESIDENT THEODORE C. SEARCH, of the National Association of Manufacturers, is of the opinion that there is some danger, in the present revival of business, of American manufacturers neglecting their foreign trade. We quote from some of his remarks on this subject as follows:

There is danger that many manufacturers who have been devoting much of their attention during the past two years to the cultivation of their export trade will feel that, with the increase in the home demand, they need give no further thought to their foreign trade until the appearance of another period of stagnation in this country.

Successful development of export trade requires steady, continuous and persistent work. Business of this character cannot be built up in a few weeks, nor can it be dropped at will and picked up again when desired. The growth in the export trade of the United States during the past two years has been amazing, surpassing all previous records.

The period of dullness which has just passed has proved a valuable experience to American manufacturers, in that it has shown to them the possibility of selling their products in other countries.

It is to be feared, however, that many who have had their first ventures in foreign trade during the past two years will now turn all their attention to the home market and sacrifice the foreign connections which they have established and which would be of great value in the future if given considerate attention. The attention of the members of the National Association of Manufacturers, and all other manufacturers who have any interest in foreign trade, is earnestly directed toward this matter in the hope that they will realize the importance of holding and cultivating all they have gained in export business during the late depression.

We do not agree with President Search that there is any such danger as he alludes to. Such a condition may be possible, remotely so, but not probable. Our manufacturers are too alert and energetic to let slip any opportunity of increasing their business. We are glad to learn, however, that the National Association of Manufacturers purposes systematic efforts to increase the export trade of our manufactured goods. Individual and speculative efforts will always exist and succeed, but it is in the concentration and directness of organized methods that we shall find the most assured results.

It is true that many of our manufacturers only investigated and began to develop their interests in foreign markets when business depression at home forced them to seek consumers beyond the seas. Such of these as have been successful in their foreign trade are not in any way diminishing their efforts to sell their goods abroad, and seemingly have no fears of being unable to attend to and supply the home markets.

But it is not to this alone that our increasing export trade is due. It must be remembered that a great number of our largest manufacturers have sought foreign trade not with a view to disposing of surplus production, nor to offset dull times at home, but having abundance of capital, plants capable of enormous production of a superior quality of goods, they have merely sought a legitimate increase of business by availing themselves of the markets of the world. They have achieved, too, a most gratifying success. It has been accomplished only with an immense outlay of capital and the display of that indomitable energy and perseverance which characterizes our business men. This hard-earned footing which has been gained in foreign trade is not going to decline. On the contrary, it needs no great prophet to foretell a constant and healthy increase in our export trade until we shall lead as a producing nation to supply the world's markets.

#### A BRITISH VIEW OF OUR TIN PLATE.

THE British Embassy has been studying the tin-plate industry in the United States, with a view of ascertaining whether there is any prospect of further sale for Welsh plates in this country. It is now generally conceded that the American tin-plate mills have capacity for supplying the whole of the local demand, and Mr. O'Beirne, the Secretary of the Embassy, seems to be convinced of this, for he reports that the interior United States market is lost to British exporters, and that there remains only a trade of some 130,000,000 pounds with the meat packers in "drawback" plates, a local trade on the Gulf Coast of 5,000,000 pounds and, on the Pacific Coast, of 54,000,000 pounds annually.

The development of the tin-plate industry began with the passage of the McKinley tariff, and at first the black plate was mostly imported, the local manufacturers doing only the tinning. The advantage of making their own black plates was so manifest, however, that black-plate mills were built rapidly, and to-day we make nearly all our own. The tin, of course, is imported, as the mines in the United States have all failed to produce in paying quantities. Much was expected at one time from the Black Hills mine in South Dakota, but it never produced enough tin to pay for working. The South Riverside mine in California was also hailed as a rich producer and came to nothing. The same story is recorded of the Cash mine, in Rockbridge County, Va., and the find of tin ore at King's Mansion, N. C. Time may bring us discoveries of valuable tin stone within our borders, but as yet there are no prospects in that direction. The Cornish mines are the nearest to us and our natural source of supply.

As long as we produce plenty of iron for the black plates and plenty of lead for the terne plates we can afford to be satisfied to buy our tin abroad until such time as it is discovered within our territory in paying quantities. Our methods of manufacturing tin plate are so ingenious that it is not unnatural that we have already come to export it in small quantities. Take the tin-pickling machine, for instance, which was developed in this country, and is universally used here. It is as fine an example of labor-saving machinery as is employed in any trade. It lifts the black plates from a truck, hoists and swings them around into the pickling vat, where they are agitated by an up-and-down motion; then removes them to a swilling vat where they are washed, and swings them back to a truck again, all with the aid of a single attendant to hook on and unhook the plates at the truck and to operate the valves of the machine when it is necessary to change its motions from one kind of work to another. The steam does every particle of the work, and the machine handles three sets of plates at a time. All the hoisting and lowering and vibrating and swinging motions are accomplished by the same steam cylinder through different arrangements of the valves. The trimming and shearing machines used are also superior, all the plate being made to exact size, and labor saved in many instances by cutting a series of sheets at one stroke. The methods employed in rolling are also largely automatic, and the construction of the tinning sets is such as to insure perfect coating of the plates.



## THE PAN-AMERICAN CONGRESS.

RESULTS most encouraging and beyond the expectations of the most sanguine, at least as to immediate effects, have followed upon the recent visit to the United States of the Congress of South American merchants. In almost all the principal cities they visited desirable business connections were made which must lead to a very large future commerce between their countries and the United States. In many instances orders were given which will ultimately amount to millions of dollars.

The New England manufacturers of shoes, carriages, watches and clocks, arms and the cotton mills were especially fortunate in securing large orders for future supplies. Shoe machinery was especially studied with a view to establishing factories. Rifles and ammunition, portable houses, pig iron, cannel coal, furniture, brick machinery, sprinkling carts, paper and architectural work in the construction of several large buildings are items that may be mentioned for which large contracts were placed.

Some of the members of the party were much surprised to learn that there were many lines of goods that they had been receiving from Germany and England which they had no idea we made, and a number asserted that they were able to make more advantageous terms for goods which they believed to be equal, if not superior, to what they had been receiving from European countries. One order in Pittsburg will cover \$1,500,000 worth of goods the coming year. It is too early to state definitely the amount of business that will result from this visit during the next year or two, but, at any rate, our relations with our southern neighbors have received a stimulus that must be far-reaching and enduring.

## WIRE-MAKING.

THE rapid growth of electrical appliances and of industrial methods requiring electrical apparatus has stimulated the manufacture of wire in the United States, and the variety and qualities obtainable are little short of marvellous. The construction of wire fences for the vast farms of the West requires as great a supply as for electrical wiring, and the demand for screens, mattresses, springs and a thousand and one common articles calls for an enormous production. Our methods of wiredrawing appear to have approached very near perfection, the smallest sizes being drawn through diamond dies of the most exquisitely minute construction. The smallest size drawn is reliably stated at 1-7000 of an inch diameter. It is scarcely visible to the eye, and a piece of it gummed to a sheet of paper is not noticeable, requiring to have the attention specially directed to it before it can be discerned. It is much finer than the human hair or the finest silk. Stories about wire drawn to 1-20000 of an inch are fables. Brass wire gauze has been manufactured with 67,000 meshes to the inch, forming a soft, pliant metal fabric.

But it is in its varied qualities and adaptability to special purposes that our wire specially excels, rather than in the fineness of its drawing, which is at best but a novelty, since ruled lines upon glass are now generally preferred to fine wires for scientific instruments where very fine lines of reference are desired. Steel wire is made in all grades of carbon percentage, so that it may be had in absolutely known tensile strength and capacity for tempering. The manufacturer desiring to use a spring or set of springs in a machine to secure a certain degree of expansion and contraction without weakening, which will yield precisely at a given load and bear just such a degree of temper, can have his wants supplied at any of the great wire mills; he has simply to state the conditions under which the springs are to be used, and with certainty will receive the exact requirements.

This is a reason why the wire springs of American machinery last so long. It formerly was expected that the springs of a machine would be the first parts to wear out. But springs in much of our machinery are now made to last as long as the remainder of the mechanism. This is a real triumph, and says much for the unceasing care and tireless experimenting of the wiremakers, who have

learned at great cost just what combinations of metals are best suited to certain purposes, and when to employ a high or a low grade in carbon.

A vast number of the small machines, like typewriters, which are turned out here in quantities so cheaply, could never be made at even double the cost were it not for the skill of our wiredrawers in drawing odd sections of wire. The typewriter bars, the rims of spectacles and eyeglasses, the pinions of clocks, the knife edges of scales and innumerable similar articles are all cut from wire drawn to the proper form or section, and none of these could be fashioned by the methods used for larger parts without enormously increasing the expense. Pins, needles, screws, bolts and the like are all formed from wire specially drawn for the purpose.

The absolute exactness of size in which both common and cheap grades of wire can be obtained is another advantage connected with our production. Our bimetallic wires through which a core of steel is drawn with a surrounding of copper are produced in numerous sizes and with great exactness. They are highly valued because of their combined great strength and conductivity. Though much higher in first cost than the iron wires commonly used in telegraph and telephone service, they are so much more satisfactory that the demand for them is continually increasing.

## STANDARD TIME OF THE UNITED STATES.

FEW Europeans are familiar with the system of standard time that prevails in the United States. Local time differing by more than four hours at different points in our vast territory caused great complexity in the compilation of railway time tables, besides involving serious expense to the companies and great inconvenience and annoyance to the travelling public. The same difficulty has never been so manifest in Great Britain and on the Continent because of the absence of great railway trunk lines extending east and west over a broad area of territory. In this country, with great distances between important cities, the system of local time proved an abomination, which made it extremely difficult at times for travellers to be sure of their trains. Take Hartford, Conn., for an example. It lies five minutes east of New York City and twelve minutes west of Boston. Trains running through there issued time tables at one end of the route, according to Boston time, seventeen minutes faster than New York time, and at the other terminus time tables were issued in New York time, while one or two little local railways used the local time of Hartford. Clocks were provided in the Hartford station with red hands and black hands, one color indicating New York and the other Boston time. The ticket agents and officials were obliged to answer hundreds of times daily such questions as, "Is this 2:20 train Boston or New York time?" or "I see this train gets to Willimantic at 4:05, and the Boston train leaves there at 3:55; do you know whether they connect?"

All such nuisance was done away with in 1883, when the railways came to an understanding and adopted a time based on the principal meridians of the country, located fifteen degrees (or one hour) apart. Four time belts were thus established, known as Eastern, Central, Mountain and Pacific time, and each time belt immediately west of another was one hour later in time. Maps were issued showing the dividing lines between the time belts, which were made not absolutely upon the proper degrees, but at convenient termini of the railway systems. Thus the meridian of Washington gives its time to the Eastern belt, and New York, Buffalo, Boston, Hartford, Charleston and other cities have their clocks all set at that same time, while those of Chicago, Duluth, New Orleans, etc., coming within the Central belt, are one hour slower. In this way there is no more confusion of time tables, and any one having a standard-time map can tell the exact difference between the time used in any city of the country and the place where he may chance to be.

The time is kept uniform by telegraphing at noon daily all over the country. The wires of the Western Union Telegraph Company are run directly into the observatory at Washington where the correct time is preserved, and at three minutes before noon all wires



are cleared of business and every point is connected with Washington. The signal sent out reaches the most distant point in one-fifth of a second, and all clocks found in error are at once corrected, most of them by means of automatic synchronizers operated directly by the current from the wires.

The system proved so convenient that it was speedily adopted by the railways in the British possessions and a new time belt, known as Colonial time, was established for Newfoundland, the Province of New Brunswick and other parts. In no place does this standard time differ much more than half an hour from the true time, and people in small towns are glad to make use of it rather than to be obliged to run their clocks on the time of some nearby city or figure out their own local time, as was formerly necessary.

### THE PARIS EXPOSITION.

THOUGH we are very late, compared with other nations, in preparing for representation at the Paris Exposition in 1900, it is gratifying to note that very satisfactory progress is now being made. The special commissioner from the United States, Major Moses P. Handy, arrived in Paris toward the end of September and at once entered most actively into the preparatory work. He already reports most favorably and with a great deal of enthusiasm as to the part our country shall play in the success of this greatest exposition of the century to be held on the banks of the Seine.

The United States is now in a position to make a more satisfactory and representative exhibit than she has done at any previous foreign exposition. Our development has been in recent years, and will continue to be, so great, and the opportunity to exhibit the proud position we occupy in the industrial, scientific and artistic progress of the world is so splendid, that without doubt the United States will make a marvellous showing.

The proper display upon this occasion of our varied resources should prove of incalculable benefit to our foreign trade. All the chief importers of the world who are now more or less drawing upon our products, and many as yet unacquainted with what we have to offer, will be there to study the opportunities presented for business relations. In the retrospective part of the exposition, that is, the progress made during the century, the United States should make an excellent display. From the success American manufactures have met with of late years, we may feel well assured that all the nations of the world are vitally interested in what we produce, and foreign importers will have a golden opportunity to study our varied products.

Already there is shown great interest in the exhibition throughout the United States and the demand for space is such that Commissioner Handy estimates that at present we can fill 60,000 square feet with a most creditable display of goods. It could not have been expected that foreign countries, especially European, would have put forth such an effort for us in 1893 as they will at Paris in 1900. There is the warmest kind of interest manifested by other nations, even Germany joining in enthusiastically.

### DEVELOPMENT OF MACHINE TYPESETTING.

IN no other country is there set by machine nearly as much type as in the United States. There is now scarcely a large printing office in the country which has not its battery of linotypes or its quota of type-composing machines. Their development and introduction has involved the outlay of millions of dollars and an expenditure of ingenuity that cannot be measured. The Thorne machines were only introduced by first instructing girls as operators, sending them out in teams and guaranteeing purchasers a certain product for a definite cost. Their first machines in New York City were set up and operated at their own expense until proven profitable before the sale was closed. Now their machines are placed in hundreds of book publishing and newspaper offices throughout the country.

The promoters of the linotype had equally a hard time in securing public recognition of the good qualities of their machines.

They were first placed in New York with a guarantee to the publisher using them that the company would make good any losses that might result from the change from hand composition. It is a matter of private history that this guarantee cost the company introducing the machines some heavy indemnities. They were not discouraged, however, and going ahead overcame the complexities and imperfections of their machinery, until to-day their machines have become necessary and command a high price because of great production at small cost. Not only are these machines used by most of the great daily newspapers of America, but they have found their way into Europe and have made the name of Otto Mergenthaler famous in newspaper circles throughout the globe.

Other excellent typesetting machines are now coming on the market here, and several are seeking introduction in Europe. An experience of twenty years with machine typesetting and an observation of the success of some machines and the failure of others has given American publishers and printers a good insight into the merits of this class of machines, and any of them that have found favor here may be trusted to give general satisfaction to publishers abroad.

It took considerable time to perfect such complicated machines, and those of latest make are far in advance of those turned out by the same manufacturers a few years ago. European buyers have the advantage of choice from a market where all experimenting, testing and proving have already been done.

### MACHINERY AND METAL EXPORTS.

THE very satisfactory increase in our export trade in a few of the more important items of machinery and metals is well exemplified in the following table, culled from Government statistics:

	For Year Ended June 30, 1896.	1897.
Bicycles and parts of same.....	\$1,898,012	\$7,005,323
Machinery.....	18,127,128	26,102,076
Builders' hardware, saws and tools.....	5,509,188	6,627,466
Brass manufactures.....	872,396	1,171,431
Zinc manufactures.....	41,287	72,943
Spelter (zinc).....	187,318	1,756,617

The exports of machinery to the United Kingdom of Great Britain was almost double that of the preceding year. The machinery exports to European countries, South American states, Mexico, British America, Australia and Africa show an increase in almost every instance, the exports to China having increased almost tenfold in value. The increased export of spelter is extraordinary, being over \$1,500,000 in value.

### Increased Exports for July, 1897.

THE following table compiled from data prepared by the United States Bureau of Statistics shows a gratifying increase in the domestic export trade of the articles enumerated during the month of July, 1897, as compared with the corresponding period in 1896:

	July, 1896.	July, 1897.	Increase.
Agricultural implements.....	\$379,458	\$454,579	\$75,121
Blacking and polishes.....	36,942	45,018	8,076
Books, maps and other printed matter.....	169,683	175,976	6,293
Boilers and parts of engines.....	51,066	56,759	5,693
Breadstuffs.....	13,000,907	14,391,607	1,390,700
Brass and manufactures of.....	94,614	121,564	26,950
Carpets.....	4,770	10,482	5,712
Cars, passenger and freight.....	102,890	149,612	46,722
Cement.....	3,744	16,608	12,864
Chemicals, drugs, dyes and medicines.....	663,333	803,328	139,995
Copper and manufactures of (not including ore).....	2,443,688	3,028,751	585,073
Cycles and parts of.....	444,074	458,519	14,445
Doors, sash and blinds.....	55,624	62,836	7,212
Earthen, stone and china ware.....	13,770	28,794	15,024
Engines (stationary).....	13,380	32,162	18,782
Furniture.....	316,274	320,170	3,896
Instruments (scientific).....	181,506	324,650	143,144
Paper and manufactures of.....	225,530	396,866	171,336
Plated ware.....	27,432	34,154	6,722
Printing presses and parts of.....	13,540	56,888	43,348
Roofing, slate.....	44,563	111,173	66,610
Scales and balances.....	24,597	33,798	9,201
Sewing machines and parts of.....	221,286	254,987	33,701
Soap.....	84,558	117,282	32,724
Starch.....	81,422	163,695	82,273
Stationery (except paper).....	52,560	79,396	26,836
Stoves, ranges and parts of.....	20,187	33,437	13,250
Tin, manufactures of.....	24,966	28,147	3,181
Toys.....	8,184	8,734	550
Trunks.....	5,702	8,372	2,670
Typewriting machines and parts of..	50,916	108,889	57,973



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The only article that will produce a quick, brilliant and waterproof lustre without injury to the leather. The professional bootblacks of the United States use far more of this article than all other makes combined, because it

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package contains a 2-oz. bottle of russet leather cleaner and a small decorated tin box of russet leather polishing paste. The cleaner removes the dirt and stains, and the paste adds a bright, durable and waterproof polish. Price per gross, \$8.00; discount 10 per cent.

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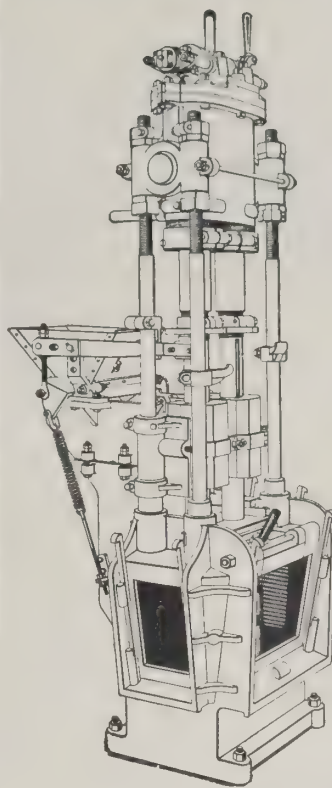
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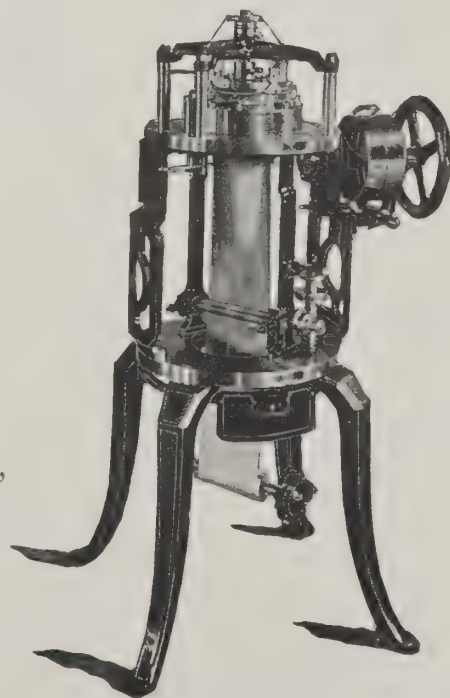
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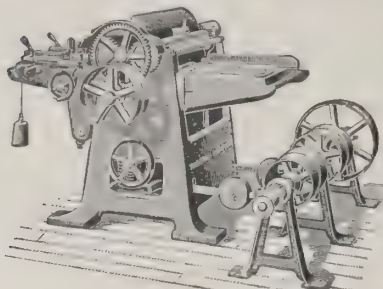
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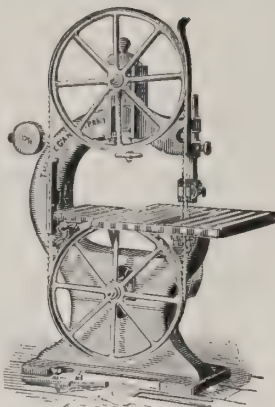


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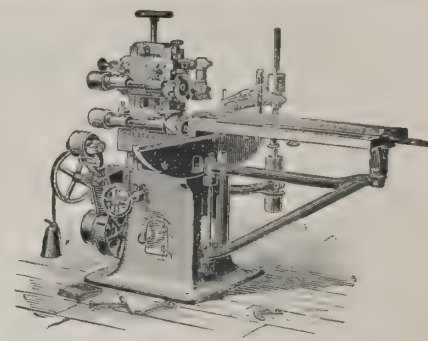
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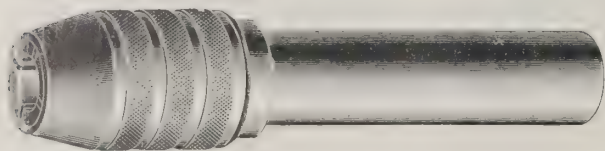
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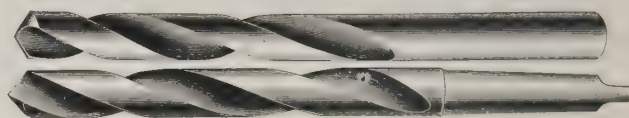
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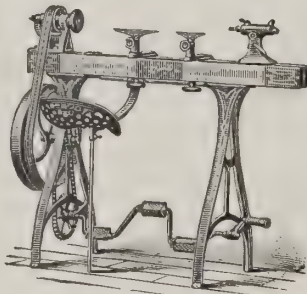
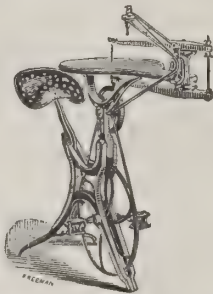
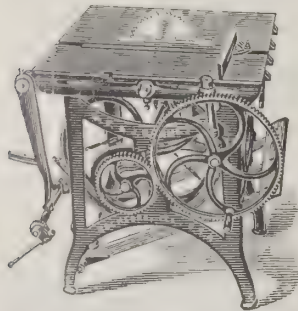
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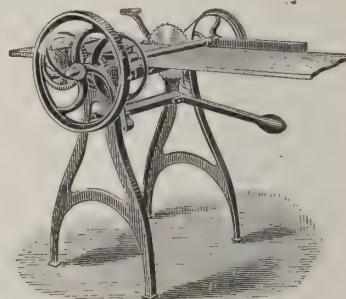
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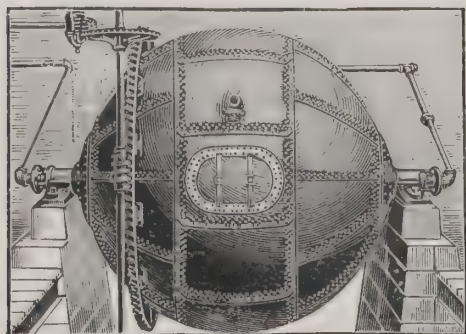
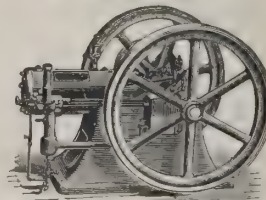
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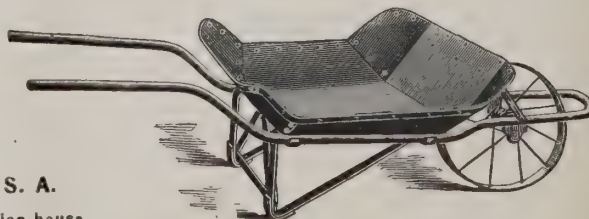
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DEVOTED TO THE FOREIGN TRADE IN MACHINERY AND HARDWARE.

### The Evolution of a Machine.

A RECENT number of *Cassier's Magazine* contains an interesting article upon the evolution of a machine wherein is shown the gradual development of one mechanism from another just as happens in the world of organism like, unto which too there are many useless survivals. Certain necessary features of the original sometimes remain in a modified form in the successor although their usefulness has long since vanished. An instance of this has often been referred to in a case of costume where the two buttons on the back of a frock coat still remain though the sword belt to which they owe their origin has become a thing of the past. The writer refers among other things to the horseless carriage, and says:

"The theory of evolution has been applied to the mechanical as well as the animal world, and it is sometimes quite possible to trace the descent of a piece of machinery from various details of its construction. Thus many of the earlier woodworking machines were built upon wooden frames, and when iron frames were substituted, the lines of the wooden construction were followed for a long time, although quite unsuited to the changed material. Similarly when railroads were first started in England, the carriages for personal transportation were constructed by making a long body frame, mounted upon trucks, and placing it on three stage coach bodies, all being well bolted together. The travelling public were thus given accommodations which, in interior arrangements at least, resembled very closely those to which they had been accustomed, and after some demurring the new order of things was gradually accepted. As the art of car building progressed, however, it was soon found much better to construct the whole affair as one piece of work, but the influence of custom was so strong that the British railway carriage is still built on the stage-coach model, and it is to this cause, rather than to any other, that the compartment system owes its being. Although the carriage is practically built as one vehicle, it is ornamented on the outside by moldings, curved to follow the old lines of the stage coach body, and even when these moldings are omitted in the lower class carriages, curved stripes of paint are put on to tell the story of the evolution of the car from the coach.

"But there are other examples of the absurdity of imitating in form a construction of which the need no longer exists. The motor carriage is already in evidence, and it, too, bears the earmarks of its horsey, though horseless, origin. One of the latest forms of these carriages bears all over indications of the existence of the horse that isn't there. In front there is a high leather dashboard to protect the riders against the splashing from the heels of the absent animal, while the finish of the heavy trimmings could only have emanated from the establishment of a builder of carriages made for horses, and the whole vehicle looks as if it ought to have a pair of lively animals in front of it to make it look complete. It is indeed difficult to get rid of old ideas even when the necessity of their pre-existence is absent; but the mental inertia which makes such things possible is probably inherent in human nature, and its elimination requires a long course of education and experience."

### Exporting American Tinplates.

TEN years ago the United States practically imported all their tinplates from this country. They used an enormous quantity annually for roofing, canning, and general purposes, and they made none themselves. Since then they have gone into the business of producing for themselves, and under the *egis* of a heavy protective tariff have created a number of works, which are now turning out so large a tonnage that they have a surplus for export. They have received orders from Italy, and are said to have also received an order or orders from England. Thus, in a few years, the tables have been turned with a vengeance, and although South Wales still sends a good tonnage of tinplates to the United States, the business is doomed to die out before long. When the American trade has gone, what will South Wales do with its plates? It has had hopes of doing more with Russia and other countries; but if the pushing Americans are also going to compete in the outside markets, where will be South Wales, unless the makers there "wake up," reorganize their works, and put their labor on a reasonable and sensible basis? We have been asking this question or variations of it for any number of years past, but have never yet had a practical response, and we scarcely hope for one at this late stage of the melancholy history—we might almost say suicide—of the Welsh tinplate trade.

—London Ironmonger.

### Machine to Register Letters.

THE latest development of slot machines in the United States comes in the form of an invention designed to make every person his own registered letter clerk and to facilitate the system of making up and forwarding of registered mail. Three such machines were placed in position at New York about a fortnight ago, one in the registry division of the General Post Office, one in an alcove of the lobby of the Equitable Building and one in the branch post office at Forty-second street and Park avenue. The use of these three machines has been sanctioned by the Postmaster General, and under his orders they are to have a six weeks' trial. What may happen after that is conjecture only, but the assumption of the inventor of the machine is that if its work is satisfactory it will be adopted as a regular adjunct to the Post Office system.

The machine, which is made of iron in shape of a high writing desk, weighs about 500 pounds. To mail and register a letter one places a United States dime in a slot at the top of the machine. The coin automatically opens a slot to receive the envelope and also a small registering window which exposes a section of a roll of plain white paper upon which the sender inscribes his own name and address as well as the full direction of the letter. After the letter has been mailed a lever at one side is drawn forward until a gong rings. This postmarks and registers the letter and at the same moment throws out a receipt almost into the sender's hands. Upon this receipt is imprinted the post office date marks, the serial number of the letters and the signature of the postmaster. The original writing remains in the box until the letters are removed, when it is taken out with them. The moment the receipt is delivered the machine becomes locked again, and only the insertion of a coin will open it. Worn coins or those not of the same weight and size as a silver dime will not make the machine work. The makers say it is impossible for any one to cheat the machine or for it to cheat any one. An important feature is to get the letter to the post office without allowing the letter-carrier a chance to tamper with either the letters or the duplicates of the receipts. The box has a hopper bottom so constructed that it can be opened only when the mail bag is attached to it. The mail bag can't be opened, either, except in conjunction with the hopper or at the post office. The strip on which are written the names and addresses drops into the bag with the letters.

The dimes fall into a brass cylinder in the order in which they are dropped into the machine, and the postman, if he finds a bad one, can tell at once, by running them over in order, which letter it belongs to. Such a letter will be held and its sender notified to pay the postage in good coin and get his bad coin back. Aside from this, the machine is constructed to throw out bad coins if they are under weight. When the coin first drops into the slot it goes into a delicate balance, where it is weighed. If it is too much worn to be current the scale rejects it, and instead of passing into the machine and starting the posting operations, the coin drops out of a hole in the front of the machine and falls on the floor. If the postal authorities wish the fee of registration to be paid in postage stamps affixed to the letter, instead of in coin, the mechanism for the opening of the machine by the insertion of a coin can be dispensed with and replaced with a button. While the machines are being put to their official test an agent of the post office is to be in constant attendance at each. He will explain the working of the machine to the public and see that no one tampers with the mail.

### Improved Style of Tap and Die.

A NEWLY patented improvement upon the common tap and die used for tapping nuts, threading bolts and similar purposes appears to have some merit. The inventor claims that with the common tap each wing as it sweeps around entirely covers the surface which is being cut, sweeping it clean, not only of chips but also of the necessary lubricant. Although the tap may be flooded with oil it can scarcely be assumed that this oil is always shooting longitudinally along the tap with sufficient force and velocity to fill each revolving groove. The idea proposed, then, is simply to cut away every other tooth on each wing of the tap, so that each cutting tooth will be preceded and followed by an opening for the oil to flow. No further explanation seems to be required. An odd number of flutes to the tap is required to carry out the principle. The number of cutting teeth upon the tap is reduced one half, and while the tap may cut somewhat easier it should also wear out faster. It is claimed that on this tap the teeth require no side relief, the alternate spaces between the adjacent cutting points allowing the screw thread to yield slightly under the cut.



### A Novel Motor.

A YOUNG engineer and electrician, Paul Roediger, of Philadelphia, has constructed something very novel in the line of motor or engine, which brings out some new principles in the application of hot air as a motive power.

The engine he now has working at his home is of about one half horse power. The engine represents wonderful simplicity, and yet great effectiveness in its construction. It has but few parts, which are readily taken apart, and as readily assembled again, and a single gas jet, burning one cent's worth of gas per hour, is sufficient to generate one horse-power. The flame is applied to the lower part of the upright cylinder. The upper inside of this is fitted with a piston, which moves in a space covering about one-third of the tube's length. Moving below this, in the same cylinder, is a plunger, consisting of an airtight cylinder, with a small air space between the plunger and the walls of the tube. The upper exterior of this latter is wrapped with pipes for the purpose of maintaining a cooling current of water. The action of the heat on the air in the lower part of the cylinder moves the plunger, and heated air is then forced into the upper end, where it is immediately chilled and drives the plunger down again, and at the same time the piston is forced up. These two moving parts act upon an eccentric, ingeniously arranged so that neither is on the centre at the same moment, each helping the other at this critical part of the cycle.

In the model in operation about three minutes' time is required to get the engine in motion after the heat has been turned on, but one of the novel features is that it will run, under load, for the same length of time after the gas has been turned off, so that practically no time is lost getting under way. The engine is automatic and needs no skilled attendant. With two of these power-generating cylinders mounted on the same shaft the flywheels may be dispensed with. Then the motor may be operated by means of an electric touch-button regulating the flame. There is no possibility of an explosion or danger of any character. When the engine is under full headway it can be almost instantly stopped by the mere opening of a valve, which allows the hot air to escape from the interior of the cylinder.

### American Clothes Wringers.

ABOUT thirty five years ago the first American clothes wringer was produced and put upon the market. It was a substantial and serviceable machine, but rather too costly to meet with general acceptance. Later some improvements were made and the price was reduced, but it is only within the past twelve or fifteen years that the clothes wringer has come to be considered almost indispensable for family use. Its present cost is about one-fourth of the original price and the annual output of the machine is close upon 750,000.

Clothes wringers are made with rolls of 10 to 24 inches in length; wringers larger than that are made to order. Ten, 11 and 12 inch are the sizes commonly operated by hand, though 14 and even 16 inch wringers are sometimes used in that manner. Larger machines are operated by other power. American clothes wringers are sold in many foreign countries, though in some, owing to natural or other conditions specially affecting the use of such appliances, comparatively few are sold. Thus, while many articles of American manufacture are exported to South American countries, there are not many clothes wringers sold there owing to climatic conditions, which are such in most of the countries that clothes dry quickly there and wringers are not much needed.

Few American wringers are sold in France, where washing is done commonly in wash houses and few wringers of any kind are used. In Germany, Russia, all the Scandinavian countries and in Great Britain American wringers find a market, and they are sold also in Australia, South Africa and other foreign lands. Superiority in workmanship and adaptability to use enable the American wringers to sell easily in competition with foreign makes, notwithstanding that their cost is against them.

### Large Gear-Cutting Machine.

NOTWITHSTANDING the improvements in the art of molding and the perfection reached in castings cut gears are still much to be preferred and in consequence there is a growing demand for gear-cutting machinery. Rapid progress is being made in the development of heavy automatic lathes for this purpose.

A prominent manufacturing concern has recently had built to order for its use a gear cutter that will cut gears up to 100 inches in diameter, 20 inches face and to 4 inches circular pitch, or by means of a special attachment up to 6 inches pitch.

The machine takes standard gear cutters up to 12 inches diameter with 3 inch hole. These large cutters, as used in this machine, are provided with a side locking cross key which renders their slipping on the arbors an impossibility. The cutter arbor has room enough for a blocking cutter and a finishing cutter for 4-inch pitch, so that one tooth is finished for each movement of the slide. The machine is driven by a single belt and the cutter speeds are changed by the substitution of change gears.

The automatic dividing and shifting mechanism is operated at a constant speed which is not affected by changes of the cutter speed. The cutter slide advances steadily under a heavy cut and a quick and easy return occurs without jar or noise. The cutter arbor is worm driven, the worm running in a bath of oil. Spiral gearing, incased for automatic lubrication, is also generally used on the machine.

Wheels of any weight can be placed in the machine, by travelling crane or

other means, without disturbing any set adjustments of the machine. A half clamp, removable from the driving end of the arbor, allows it to rise vertically without interference. The outboard support of the wheel mandrel is raised and lowered by hand or power simultaneously with the main spindle. It can also be moved in or out for short or long mandrels. Two special drivers on the face plate hold the gear to be cut firmly in either direction and a new automatic device clamps the rim of the wheel firmly while the cutter is operating. This clamp is automatically released at every shift, leaving the wheel free to turn. The dividing or master wheel in this machine is about 60 inches diameter, made in two sections to secure accuracy. It can be instantly released from the worm, leaving the wheel which is to be cut free to be turned, so that it can easily be tried to see that it is true on the mandrel. The improved dividing mechanism is positive in its action and the cutter slide cannot advance unless the indexing is correct. A simple pump of large size floods the cutters with oil and large pan capacity is provided so that the oil may cool. It is expected that this machine will cut in one day a gear 84 inches diameter and 12-inch face.

### Improvements in Small Firearms.

REFERRING to the improvements made in the smaller firearms, a Connecticut manufacturer reports that there has been more progress made in the revolver trade during the past ten years than in any other line.

"There was a time," he continues, "when the old-fashioned, single barrelled pistol could not be manufactured for less than \$1, or even more. That time has gone, and the single barrelled pistol is a thing of the past. In its place came the revolver, which is now made in all sizes, from a vest pocket to the revolver which is carried in a holster. The prices have kept on going down as the revolvers have improved in manufacture, so that now a perfect-working and reliable revolver can be bought at retail as low as \$1, and even the best makes for \$2 or \$3.

"The self cocking and hammerless revolver, which five years ago sold at \$10 and \$12, can now be bought by the carload as low as \$2 or \$3, and the better goods at from \$4 to \$6. In these arms the best steel is used. The German revolver, which was the only one which ever seriously competed with those of American make, has about run out its race and is never offered any more except in country stores, where it is bought by the boys. It is clumsier made and heavier than the American revolver, and no more compares with the latter than does the English line of revolvers, which at one time were very freely sold in this country. Likewise, the American rifle and shotgun have outdistanced all other makes, though the German cheap shotguns still find a good market with those who do not care to put much money in a shotgun. The American double-barrel shotgun which sells at retail for about \$12 is a much cheaper gun in the long run than the German make which sells at from \$5 to \$6, as all of those who have had experience with them discovered long ago."

### Typewriters for Siam.

AN American manufacturing company has on exhibition in Broadway, New York, one of a number of typewriters made to order for the King of Siam, who is at present travelling in Europe. There are seventy-six characters on the keyboard, a number of which are in the nature of accents, qualifying the other characters, and these are so related to the letters that in all about 1,500 characters can be produced from the keyboard. The accents all have to be upon dead keys—that is, keys that when struck do not cause a movement of the carriage, so that the accent may first be printed and then the letter, without having to move the carriage back. In some words it is necessary to use as many as three accents.

There are no capital letters. Besides the alphabetical characters there are the usual ten numbers in Siamese script. The company first began making these machines about three years ago, under the instruction of a Secretary of the Siamese Court, who came to this country for the special purpose. There are now several hundreds of the machines in Siam, and the saving of time and labor is much greater than would be the case in an Occidental nation, as the Siamese have no script, and all letters are printed individually. In no respect does the mechanism differ from that of the English writing machine, save in the unimportant matter of the "dead keys." There are seventy-six keys, the same number as in the regular machine of this make.

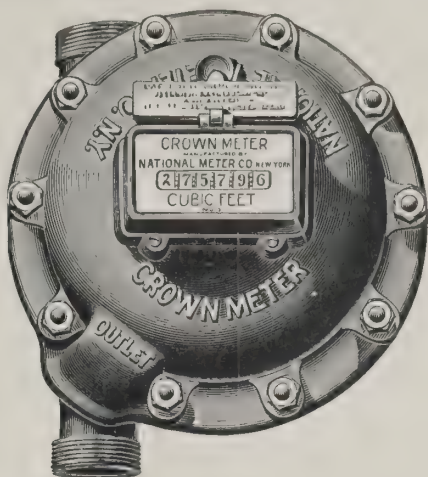
### Boilermakers' Standard Specifications.

THE committee of the American Boilermakers' Association on standard specifications recommends an established distinction hereafter between shell steel and flange steel. According to this new rule shell steel not exposed to the direct heat of the fire or gases of combustion may have from 65,000 to 70,000 pounds' tensile strength, with an elastic limit of half its ultimate strength; shell plates which are exposed to the fire or gases of combustion or on which any flanging is to be done to have from 60,000 to 65,000 pounds' tensile strength, with an elastic limit half the ultimate strength; plates for fire boxes, such as are exposed to the direct action of the fire and flanged on the greater portion of their periphery, to have 55,000 to 62,000 pounds' tensile strength, with an elastic limit half the ultimate strength. In regard to elongation the committee discards any distinction in respect to thickness, and makes the elongation 24 per cent. for shell plates of the highest tensile strength above given, 27 per cent. for those of medium tensile strength, and 30 per cent. for fire box and flange plates—all on 8 inches. For rivets the use is recommended as essential of either good charcoal iron or a soft, mild steel having the same physical and chemical properties as the fire box plates.



Interesting Information for Water Works Officials about

# WATER



# METERS

They measure correctly the amount of water passing through a pipe.

**They increase the revenue,  
Restrict the waste,**

and assist in maintaining a uniform pressure in the water main.



We have many letters of similar character, copies of which we would be pleased to mail you.

## NATIONAL METER CO.

118 CHAMBERS ST., NEW YORK.

**The Largest Water Meter Manufacturers in the World.  
Over 184,000 in Service.**

[OCTOBER, 1897]

City of Highland Park, Illinois.

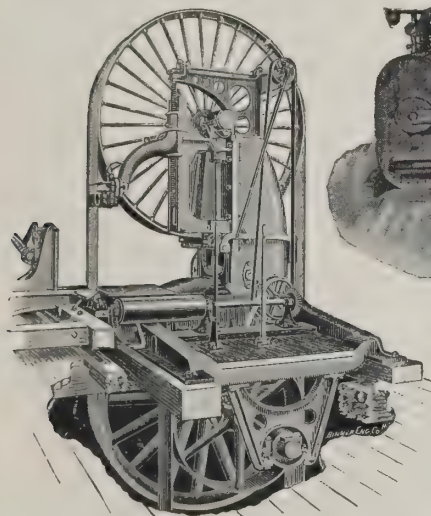
NATIONAL METER CO.,  
298 Broadway, New York.

GENTLEMEN:

Replying to your favor of the 8d inst., would say that the city of Highland Park adopted the meter system in their water works in the winter of 1894-95. The result has been a material increase in revenue from the system, and a decrease in pumpage of at least 40 per cent. The water takers are well pleased with the service, as each pays for what he actually consumes. The city derives another advantage from the fact that leakage is quickly discovered, thereby increasing the economy of operating the system. Our experience has fully satisfied the most skeptical that meters soon pay for themselves in increased revenues on the one hand, and reduced cost of operating on the other.

Yours very truly,

J. C. CUSHMAN.  
Chairman of Water Committee.



Band Mill.



60 or 100 horse power mill. Portable Saw Mills from 12 to 100 horse power.

## LUMBER MAKING MACHINERY.

THE MOST MODERN.

BAND MILLS—6, 8 and 9 foot wheels.

CIRCULAR MILLS—All sizes. Suitable for handling any size and kind of timber.

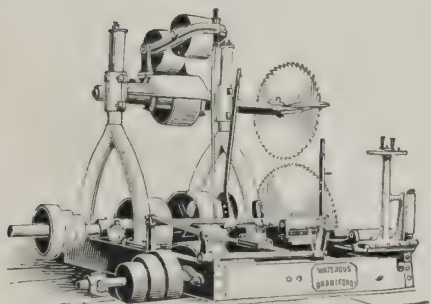
BAND RE-SAWS—For Saw Mills. Increase largely quality and quantity of daily output.

STEAM-ACTING SAW MILL APPLIANCES.

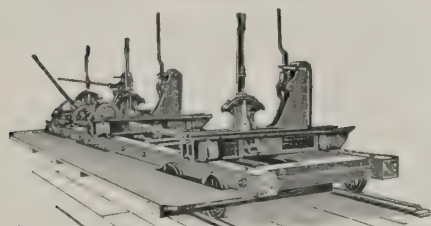
PULP WOOD MACHINERY.

BARKERS—With automatic turner; one man barks 15 cords, 10 hours.

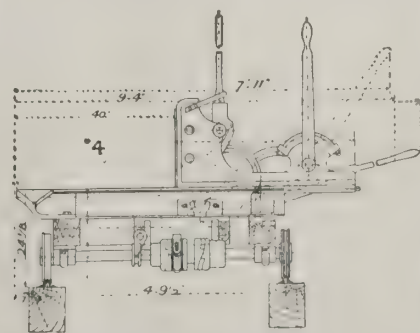
AUTOMATIC CUTTING-OFF SAW—2 men with this machine cut 60 cords of pulp wood 16 to 24 inches long, or 100 cords 48 inches long in 10 hours, taking logs from water and delivering cut wood to conveyor.



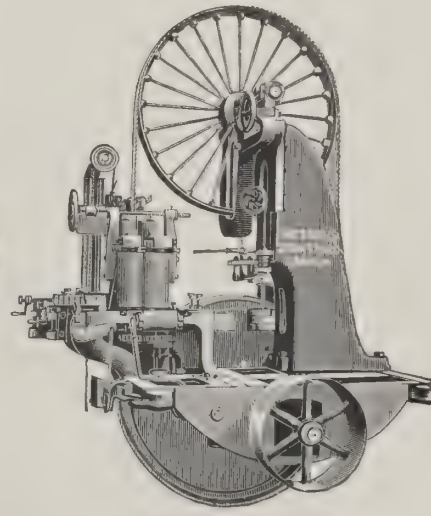
Saw Frame No. 3.



No. 5 Log Carriage.



No. 4 Carriage, showing Off-set for Band Saw.



Band Re-saw.



Established 1844.

New Works, 1896.

WET GRINDERS.  
WET MACHINES. SCREENS,  
WOOD CHIPPERS,  
CABLE and CHAIN ELEVATORS and CONVEYERS.

A successful experience of over 50 years is your inducement to correspond with and purchase from us. Long experience in the export trade insures satisfaction. Plans and competent men furnished. Address

## WATEROUS, BRANTFORD, CANADA.

Ask for Quotation and New Catalogue.

"LIEBER" and "A. B. C." Codes.



### A Typewriter for Books.

THE New York *Sun* publishes the following description of a new typewriter designed to record in books: "A machine for book writing has just been completed by Mr. Crawford Elliott and Mr. W. P. Hatch, inventors, of this city, which embodies many unique features, and a comparison of the new device with typewriters not adapted for book work is interesting.

"In designing the book writer its makers have, wherever possible, adhered to the principles of construction employed by manufacturers of other first-class typewriters adapted for writing on loose pages. The keyboard is small and compact, and is known as the universal, the arrangement of the letters being the same as that on most standard typewriters. There are forty-four celluloid keys, which together represent eighty characters. The type basket, in which the type are arranged in circular form, is beneath the fingers of the keys, and is in full view of the operator. When a key is depressed the character attached to it is forced downward onto the paper, and is brought back again by a steel spring connected with the type bar. The fingers of the keys which lead to the type bars are also steel. The book to be written in is opened and placed upon a table underneath the machine, which is then adjusted to the desired height, its position depending entirely upon the book's thickness.

"A part of the book writer which is very conspicuous, and which suggests its special adaptability, is a long and broad platen at the bottom, on which each page of the book rests while the machine is in operation. The platen is hinged at the back and is raised and lowered to accommodate a new page. When a leaf is turned over onto the platen a metal frame, also hinged at the back, is brought down upon the paper and holds it securely in place. Then the carriage is lowered and the operator proceeds the same as on any other typewriter.

"Hitherto inventors found difficulty in obtaining both upper and lower case letters on a book typewriter without having a double keyboard, which was objectionable. The idea of using a special or shift key for that purpose, the same as is done on several ordinary typewriters, seemed impracticable. On the new machine, however, the change from small to large letters, or vice versa, is readily accomplished, and a shift key is the medium employed. When that key is struck a metal disk, situated in the top and centre of the type basket, and about an inch and a half in diameter, is depressed. With the disk in that position each type that is struck comes in contact with it, and, without noticeably checking the movement of the type bar, the lower case letter is instantly displaced and an upper-case letter substituted. On releasing the keys the letters resume their former places automatically. A peculiar arrangement of the type on the type bar renders the change possible. Instead of the characters being set stationary in the end of each bar, as on other typewriters, they are left free to turn at the will of the operator, and when once turned a spring holds them in place until an impression is made on the paper. Besides being used to make upper case letters, the shift key enables one to strike several punctuation marks and other characters commonly required.

"A serious stumbling-block in the way of making a practical book typewriter was the supposition that while the writing is being done the machine itself should remain stationary as do other typewriters, and the paper to be written on should move. And that method has, to some extent, proved successful as applied to book typewriters, when small and light books were inserted; but large-sized books were found to be too cumbersome to move freely, and bad work resulted. In the new typewriter the order of things is reversed, and, instead of the paper being moved to accommodate the position of the machine, the machine itself moves to suit the position of the paper. An operator, therefore, while manipulating the keys, finds his keyboard travelling constantly from left to right, and at the end of a line he draws the whole mechanism back to the beginning of the scale for another trip across the page. As the writing continues the machine is likewise moved downward on the page until the bottom is reached, when it is raised and thrown back to admit another sheet.

"Spacing between the lines is done in a manner quite new to the average operator. At the right-hand side of the typewriter are two metallic projections, and by pressing these together with the thumb and forefinger the machine may be moved the width of a single line or carried down the page as far as it is desired. To move the carriage from side to side when not writing it is necessary to depress a small lever at the upper right-hand edge of the type basket. Near that lever is a hard rubber knob, which may be grasped to assist in drawing the carriage back to the starting point. Spacing between words is done by striking a space bar directly in front of the keyboard. Types are inked by a ribbon, the working of which is very similar to the ribbon movement of other typewriters.

"On many writing machines nowadays the line that is being written appears in full view of the operator; and that feature has not been overlooked in constructing the machine in question. Just below the carriage release is another lever, which, when depressed, lifts the ribbon and reveals the last word written. If a letter has been omitted or it is desirable to erase the whole word one may plainly see where to make the correction. Tabular work and manifolding may also be done with facility.

"For the convenience of the operator, and to expedite the work of raising heavy books to the proper plane after they are placed under the machine, there is a contrivance at the rear, which is fastened to the table and is operated by means of a thumbscrew. When once adjusted the plane regulator need not be disturbed for a whole day or perhaps a week; its readjustment being governed by the amount of writing done.

"The inventors of the book writer recommend it for indelible record, unlimited speed, great durability, and absolute freedom from blurring by the ribbon. While it is essentially a book typewriter, and is intended for making records in all sorts of large bound volumes, its scope of utility includes the work

done by all other typewriters, and a single sheet of note paper seems quite as much at home beneath its keyboard as a book two feet long. The contrivance as a whole is somewhat wider and longer than most other writing machines and is only about six inches high."

### Mineral Development in United States.

REPORTS credit two States recently with developing mineral prospects that will enhance the prosperity of the West very materially. Colorado now claims that its local mines will produce fully \$20,000,000 in gold this year. The total receipts at the branch mint since January 1st already exceed \$7,000,000, and this does not include what has been shipped East from smelting and chlorination works. The August mint receipts were 300 per cent. in excess of those of the corresponding month last year. Montana comes forward likewise with an encouraging report. Hundreds of prospectors are now flocking to the newly opened mineral district on the Yellowstone River, where it is believed some of the recent placer strikes vie with the richness of those in Alaska. So far the mining is being done with sluice boxes and pans, but the accessibility of modern machinery has already sent into the section investors who promise to soon make it a new industrial centre.

### A Self-Lubricating Bearing.

QUITE an ingenious device has been contrived by T. W. Healy, a well known mechanic in Milford, Me., viz., a self-lubricating bearing, which it is believed possesses superior qualities to anything yet proposed in this line. It consists of a compound of metal and graphite combined in such a manner as to hold the graphite in solution, this latter feature being the chief point of originality in the invention. All the metals that are used fuse at a much lower temperature than will vitrify glass, which requires 4,000° F. The metals employed are thoroughly mixed while in a powdered form and combine before the glass becomes liquid, and are then pressed into the journal; this makes a hard and self-lubricating bearing, and one which cannot be melted out by any friction that could occur, as it will stand a red heat, glass alone making a journal that will run with less oil than Babbit metal but it is too brittle. The Haley journal is made of glass, lead and graphite, which secures self-lubrication; for light shafting a little antimony is used, and for large shafting powdered aluminum and brass are added.

### Aluminum for Clock Hands.

A NEW use has been found in this country for aluminum in the making of clock hands, for which it is perfectly adapted. The pointers of great clocks were formerly made of soft wood. For these were substituted pointers made of thin sheets of copper, a pointer being composed of two strips, which were cupped or hollowed and then brought together edge to edge, with the rounded sides out, thus giving rigidity as well as lightness. Aluminum pointers for big clocks are made in this way, but they are far lighter and easier to balance.

It is not unusual on large clocks in windows and elsewhere to see projecting from the base of the long pointer and in line with it a rod with a ball at the end, this rod being perhaps a third as long as the big pointer. This rod and ball are a counterweight for the big pointer, which, without a counterweight, would in its movement around the dial bear unevenly upon the arbor or shaft which carries it. On great clocks, and often on big clocks indoors, this counterpoise is placed inside the dial, out of sight, on the arbor.

The heavier the pointer the greater the weight required in the counterpoise; the greater the weight the more friction on the arbor, and the more friction the greater power required to drive the clock. By the use of aluminum pointers these drawbacks are reduced to a minimum.

### An Apparatus for Cooling Rooms.

THE apparatus which has been devised by Prof. Ehner Gates, of Washington, for the ready cooling of rooms in Summer he declares to be capable of being more cheaply operated in Summer than a coal stove in Winter. It is simply a tall cylinder of galvanized iron resting in a large basin or pan and connecting at the top with the ordinary stovepipe or with a tube leading out of the window. In the top of the cylinder's interior is a perforated tubular ring, and on a cock being turned on this ring an artificial shower is caused inside the cylinder. The water thus flowing down the sides takes a rapid spiral motion which sucks the air down through the cylinder at a rapid rate, a fine spray inside cooling the air thus entering, reducing its humidity to normal and taking out all dust and bad odors; the water collects in the basin below, from which it is drained off, the cool air escaping through openings just above the water surface of the basin. In some experiments exhibited with this contrivance the temperature of the air on entering the cooling cylinder was observed to be about 92 degrees, while it was as low as 68 on its coming out at the bottom. When the temperature of the laboratory is 92 degrees the atmosphere inside can thus be cooled to about 70 within three hours and the humidity at the same time may go down from 100 to about normal.

—At the present price of about 32 cents a pound, aluminum is cheaper than the same bulk of copper or brass. Yet 100 pounds of brass, or 250 pounds of copper, are sold to one of aluminum. Manufacturers of the new metal disposed of 650 tons of it last year. It has nearly displaced nickel in the arts, and it is in growing demand for many articles.

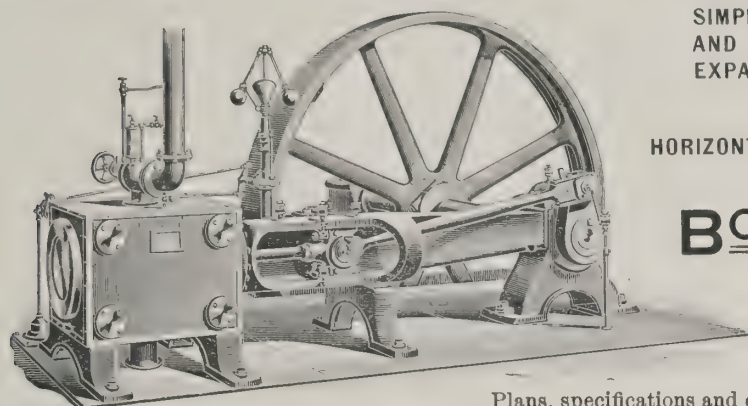


# HEWES & PHILLIPS IRON WORKS,

IMPROVED, PATENT

## Double Port Corliss Engines,

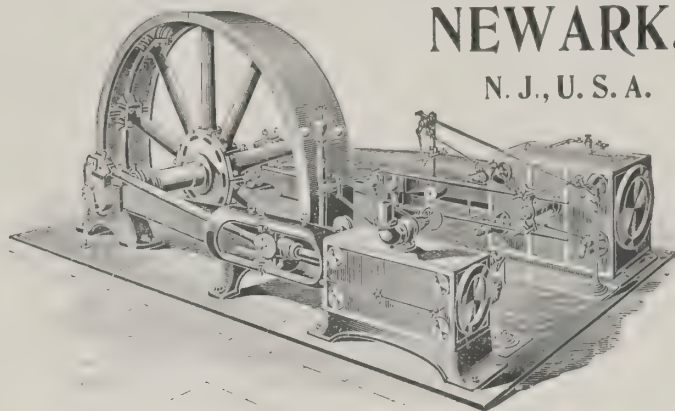
NEWARK,  
N. J., U. S. A.



SIMPLE, COMPOUND  
AND TRIPLE  
EXPANSION.

HORIZONTAL AND  
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**BOILERS.**



**Complete Motive Power Plants**  
A SPECIALTY.

Plans, specifications and estimates cheerfully furnished on application. Send for catalogue "A." Orders filled through commission houses. Correspondence solicited in any language.

## Fine Saddlery Hardware FOR EXPORT.

Harness Saddle Trees (in iron), Gig, Track, Coupe, Express. All styles and sizes.

Harness Saddle Mountings, such as Terrets, Check Hooks, Etc., Etc.

All Patterns, Brass, Nickel and Imitation Rubber Finish.

ORDERS FILLED THROUGH COMMISSION HOUSES.

CORRESPONDENCE SOLICITED.

**NASHUA SADDLERY HARDWARE COMPANY,**

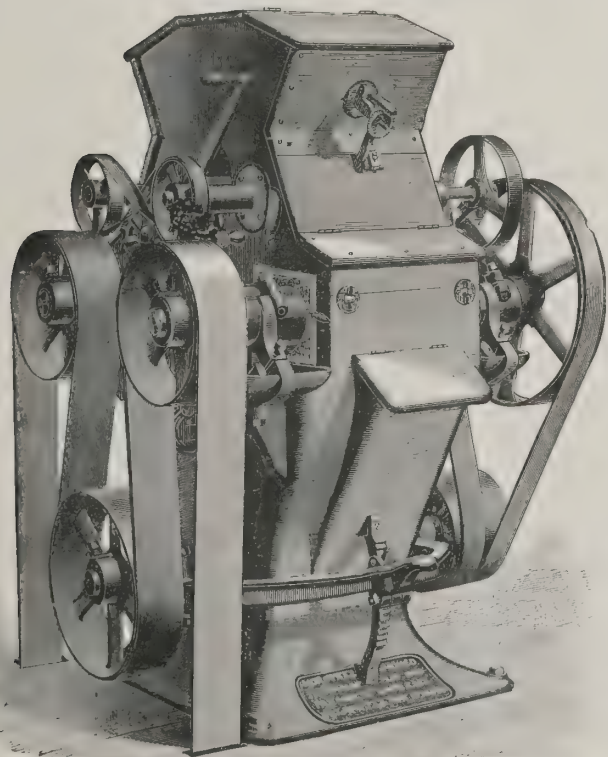
CATALOGUE "B" ON APPLICATION.

NASHUA, N. H., U. S. A.

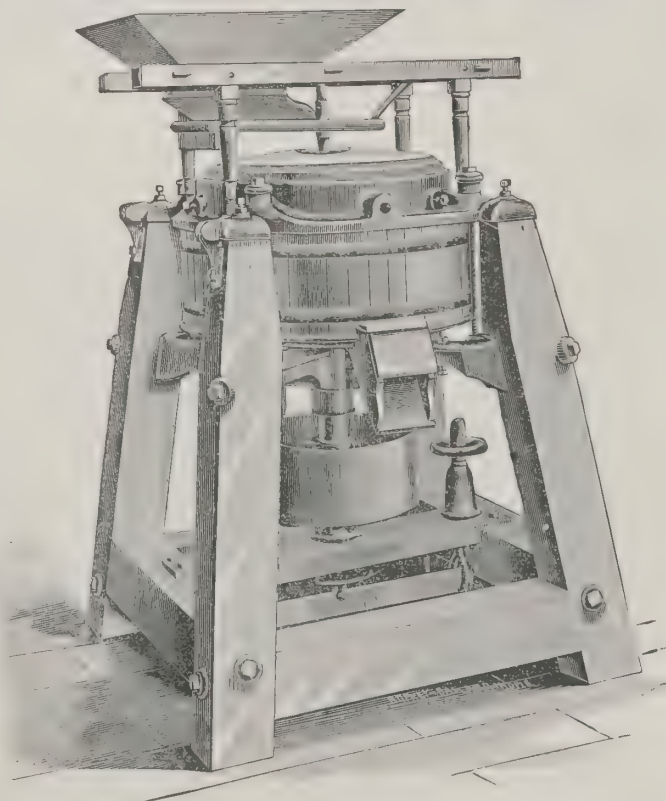
## Roller Mills.

We Manufacture  
and Sell

## French Burr Mills.



12 sizes of Roller Mills,  
28 sizes and styles of Burr  
Mills,  
Hexagon and Round Reel  
Flour Scalpers and Dress-  
ers,  
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rifiers,  
Return Air Aspirating Puri-  
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Bolting Cloth,  
All kinds of Iron and Belting  
Connections.



Our system of milling corn for Brewers, Distillers and domestic uses, such as Hominy, coarse, medium or fine Grits, Brewers' Meal, Corn Flour and Corn Meal, is the most practical and the Best. Write us for Estimates on Flour Mills, Roller or Burr Stone System, or on Corn Mills. Our Prices are Low and Reasonable. Our Machinery is first class and unexcelled. Prices named f. o. b. vessel New York. Goods carefully boxed. Illustrated Price List sent free on application.

**NORDYKE & MARMON CO.,** 23 YORK STREET, INDIANAPOLIS, IND., U. S. A.



### Suppressing the Smoke Nuisance.

SAYS a leading technical contemporary: "The revival of the agitation for the suppression of the smoke nuisance in many of the larger cities brings to attention the fact that smoke, in the common acceptance of the term, is probably the least objectionable constituent of the discharge from chimneys. A writer in *Cassier's Magazine* states that the finely divided carbon is annoying mainly because of the ease with which it comes in contact, but it is the invisible outflow of furnace gases from chimneys which is mainly responsible for the deleterious effects upon public health. Carbon partially burned to poisonous carbonic oxide, sulphurous acid, ammoniacal vapors—these are the objectionable products of the boiler furnace, and all of them are invisible and free from solid matter which might lead to their detection by the sense of sight. Mingled with the atmosphere they are not sufficiently evident by their irritating properties to cause popular complaint to the extent that is excited by clouds of black smoke, but at the same time the injurious effects upon health are none the more or less certain.

A very minute amount of carbon is sufficient to produce opaque clouds of smoke, as may be demonstrated by smoking a piece of glass until it totally obstructs the rays of the sun, and taking the weight of the glass before and after smoking it in a chemical balance. In fact, it has been estimated that the greatest weight of smoke that can be produced from a ton of bituminous coal is not more than twenty pounds. Any attempt to consume this would probably add mainly to the carbonic oxide emitted by the chimney, and thus deliver it to the public in a more hurtful form than before. The true solution of the smoke problem is to burn the fuel, not in boiler furnaces surrounded by comparatively cool surfaces and every provocation to imperfect combustion, but in suitably designed gas producers. These would deliver to the heating furnaces a clean gaseous fuel, capable of being much more completely consumed, and emitting no smoke and far less deleterious gases of combustion.

### Third-Track System.

THE third-track system of electric railroad propulsion is gaining ground rapidly in this country. The following dispatch of August 13th last from Schenectady, N. Y., to the New York *Herald*, gives some idea of the success of the system: "General Electric Company officials to-day showed the working of the Sprague multiple unit system of car traction to Isaac D. Barton, general manager, and C. B. Cornell, chief engineer, of the Brooklyn Elevated Railroad. The General Electric Company has an experimental track for the third track system, and six cars belonging to the South Side road of Chicago have been equipped with the necessary apparatus and are used for the tests.

"The cars are all equipped with the new Sprague multiple unit system of control, by which any car is operated from either end by a lever or push button with automatic return something after the manner of the Sprague elevator.

"By its application any number of cars, without regard to sequence or heading, may be coupled together, and when so coupled instantly controlled from either selected end of any car. The cars are individualized in all details. The object is to so control them that they can be connected together at will and when so connected operated from either end of any car in the train unit.

"Controlling mechanism is carried on five cars, enclosed underneath the seat inside the car. In one car it occupies the unique position of a space inside canopy over the platform, where it can be reached by an inspector without entering the car.

"Underneath each car is a small cable, terminating in a flexible end with a peculiar interlocking coupling, which, no matter what the heading of the cars may be, so connects the controlling circuits that the directional movement of the controller on the platform always produces the same movement of the car with regard to the track. There is, therefore, no such thing as a head or tail of the car. The establishment of this coupling takes less time than the coupling of a single pipe in the ordinary brake system.

"The tests made to-day for the Brooklyn gentlemen were unusually severe, but were in every way satisfactory.

"When the Brooklyn road people had watched the workings of the mechanism, the train was tested on accelerations. It takes a Manhattan "L" engine 25 seconds to get going at a rate of 14 miles an hour. The test train this morning got up a speed of 28 miles an hour in 10 seconds, 38 miles in 15 seconds and 43½ miles in 20 seconds. This beats all previous records in this direction.

"I was on the experimental train with Mr. Barton and Mr. Cornell, and their delight over the success of the trial knew no bounds. Mr. Barton, before departing for New York this evening, said:

"'You can say I have found what I have been looking for for three years—a motive power that will meet all the requirements of the Brooklyn elevated road. There is no question in my mind that the third-track system will revolutionize city and suburban traffic. The Brooklyn elevated road is at present in the hands of a receiver, but we expect to have a reorganization, and when that does take place I am confident that the Sprague third-track system will be put in on our road.'

"Mr. Cornell was just as enthusiastic. He said: 'I thoroughly agree with Mr. Barton that we have solved the problem of city traffic. What we want to do is to run a car every thirty seconds or so, not a train every five minutes. We can do that with the Sprague system. The tests of acceleration were the most wonderful I ever saw. It is the only system for our road, and I shall so report to the proper officials.'

### The Latest Roller Boat.

AMERICANS have attempted many daring things in the line of invention, and fortunes have been won and lost by the success or failure of a contrivance or scheme destined to revolutionize existing methods for accomplishing certain results. But a bolder idea has scarcely ever been carried out than the invention of the Canadian Knapp, who proposes to race over the ocean in his cylindrical boat at the rate of a mile a minute. This sounds like a vision from a fairy tale; engineers smile, practical men sneer, and it is quite easy to cite a dozen reasons, natural and mechanical, why failure must be the inevitable result, with, perhaps, fatal disaster to first adventurous navigators. However, one cannot help admiring the pluck of the individual who has had sufficient self-confidence and courage to brave the mockery of the public and to carry out his plans at a cost of no less than \$25,000. It is a big wager, and we shall be sorry to see him lose.

The boat is cylindrical in shape, 110 feet long and 25 feet in diameter. It will not run end first and cut through the water, but will present its broadside of 110 feet to the waves and will be expected to roll along on top of them, drawing only 23 inches of water. In the Bazin roller boat, which lately showed how fast it could not go in France, it will be remembered that the axes of the rollers were at right angles to the direction in which the apparatus was to travel. In the Knapp roller the axis of the single roller employed is parallel with the line of movement. The idea is to have the roller keep revolving on its axis and to screw itself along through the water by means of a lot of helical blades projecting from the periphery. The roller is to be revolved as a wheel is revolved by a squirrel within it, an engine or pair of engines, with boiler and all appurtenances, taking the place of the squirrel. The boat is externally cylindrical for most of its length, with a frustum of a cone at each end, tapering to 15 feet diameter.

A track similar to a railroad track is laid around the interior of the boat on each end, and on this track is supported, on suitable wheels and axles, a platform to carry the engines, boilers and other apparatus. The platform will be set as low as possible, and all the weight being below the centre, everything within will be expected to keep right side up, or rather down, by the action of gravity alone. There will be two sets of engines, each of 200-horse power, and boilers to match. There will be no gearing to the shell. When the engines are put in motion and they in turn act on the axles and wheels of the platform the entire internal weight will begin to climb one side of the roller, and, of course, the roller will turn, and then, of course, the starting blades on the outside will make it move along through the water. Whether the platform and all within will not oscillate more or less, or whether something may not sometime get caught and the entire contents go whirling over and over together, we do not wish to say.

Mr. Knapp expects to have his curious craft ready for her maiden voyage on Lake Ontario before the close of the present season of navigation. He is most sanguine of success, and is prepared to meet all arguments. In reply to a mild suggestion that a strong head wind might be a hard condition to reckon with, Mr. Knapp said: "With the craft running a mile a minute it will have a pressure of 18 pounds per square foot area forward. The 40-mile gale against it would blow 8 pounds per square foot, so that the boat would have 10 pounds per square foot advantage against such a gale."

This navigation of the seas at a mile a minute gait is rather startling, but the inventor assures us that ocean boats which will be built 750 feet long, with a diameter of 150 feet, will cross the Atlantic in one day. However it may turn out, the experiment will be watched from all over the world with a deal of curious interest.

### A New Telephone.

A NEW telephone for which great things are promised was exhibited in New York a few weeks ago. It is said to be a radical improvement on the present system and will not only dispense with the services of the operators at the exchange but will materially lessen the cost of maintenance of the present system by requiring fewer wires. Its inventor claims that although intended for a public telephone it will have all the advantages of a private instrument without any of the disadvantages. The instrument has a switch with fifty or more numbers on it, and to call a subscriber it is necessary only to put a plug in the hole corresponding to the subscriber's number and turn the switch, when he is called up instantly without disturbing the bells of any of the other subscribers on the line. The present private-line system requires the ringing of all the bells on the line one, two or more times, according to the number wanted. Under the existing system it is necessary to have two wires from the central office for each subscriber, while the new telephone will require only five or six wires for a hundred or more, the idea being that there will always be a wire not in use. The telephone is switched automatically to this wire and if all are in use the mechanism is so arranged that it will make a metallic circuit on the first unused wire. It will not, however, cut in on a busy wire.

As an example of the difference in the cost of maintenance of a line, 5,000 subscribers under the present system would require 10,000 wires to run into the central office, while it is contended that under this new system less than 600 wires will furnish the same service with much greater promptness and at the same time dispensing with the services of several operators.

—A shipment of 1,800 tons of steel rails will shortly arrive from Baltimore in transit for East London, South Africa. The parties making the shipment claim that it is one of the first rail orders sent from the United States to East London.



# Drop Carving Machine.

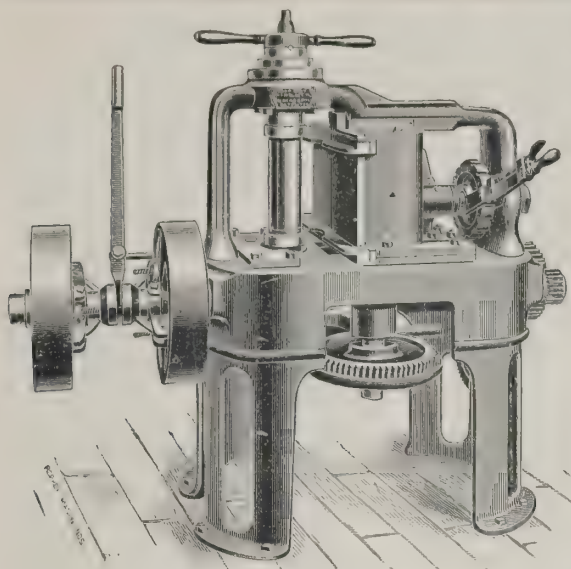
We guarantee the superiority of our machines in every single particular. Used in the U. S. and Canada by all first-class Furniture Manufacturers as well as several of the best Piano and Organ Manufacturers.

Our machines weigh from 2,500 to 4,000 pounds, possessing weight, strength, durability and adaptability to the work required never before attained in this line of machinery.

If you are interested send for Catalogue and Samples of work. Ask for Special Sheet of Drop Carvings.



This Scroll is photographed from a **DROP CARVING** made by one of our **DROP CARVING MACHINES**.



WEIGHT, 2,500 LBS.

## Drop Carving Machine.

**CARVINGS OF ANY DESIGN** produced at the rate of fifty feet an hour complete, including sanding and scroll sawing. **CARVINGS** of any thickness from one-eighth of an inch to one inch in thickness. One of these machines will produce more **CARVING** in one day than ten hand carvers. Send for Samples and Circulars.

The following cut illustrates one of the recent designs for full desk produced through the agency of this machine. For perfection of detail, work and finish, aside from beauty of design, it far excels the work produced by the old, tedious and more expensive hand methods. The difference in cost between this piano or desk panel and that made by hand would astonish any manufacturer who has not figured it out.



Nothing handsomer, more serviceable or more attractive could be placed in a piano or on high-grade furniture of any kind for three times the cost. At the same time it must be borne in mind that any furniture manufacturer can by the use of this machine produce just such work as this in his own factory. We shall be pleased to send catalogue and give full particulars to any piano or furniture manufacturer who may desire the same.

Address **UNION EMBOSsing MACHINE COMPANY, Indianapolis, Indiana, U. S. A.**

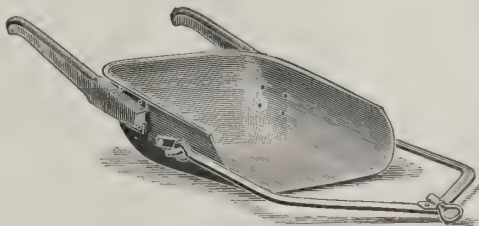
## SIDNEY STEEL SCRAPER CO.

926 Poplar Street, **SIDNEY, Ohio, U. S. A.**

Manufacturers and Exporters of

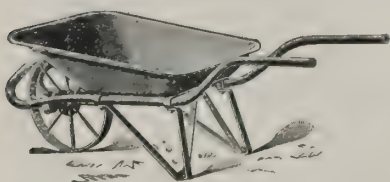
Wheel and  
Solid Pressed

## Drag Scrapers



— ALSO —

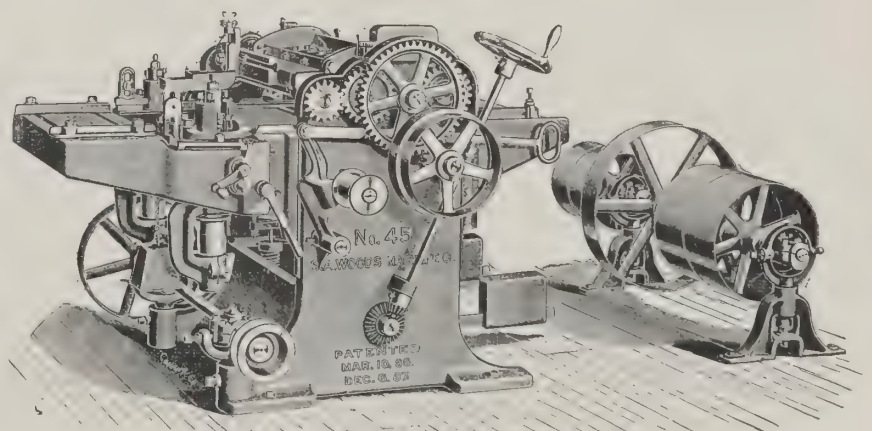
## Wheelbarrows and Trucks.



Barrow Trays are stamped from a single sheet of steel.

Wheels of wrought iron and steel with malleable hub, frame with end dump.

Correspondence solicited. Orders filled through all responsible commission houses. Catalogue No. 3 sent on application.



No. 45.—Planes one side and matches up to 12 inches wide. Works 6 inches thick, or will plane one side 24 inches wide without matching. Weight, 2,700 lbs. Packed for sea shipment. Measures 160 cubic feet. All goods delivered free on board steamer.

We build a complete line of **SUPERIOR**

## Wood-working Machinery.

A complete catalogue free.

## S. A. WOODS MACHINE CO.

**BOSTON, MASS., U. S. A.**



### Apparatus to Test Velocity of Projectiles.

PROFESSOR J. A. BRASNEAR has just completed the second photochronograph, which he has made for the Government, for testing the velocity of cannon balls. The new apparatus has many improvements over the old one and has met all the expectations of the Government experts. But one lever is used to fire the gun, start the tuning fork to vibrate, open the main shutter and release the electric connections which throw a beam of light on the photographic plate, which rotates 1,500 revolutions per minute. The length of the streak made on the photographic plate is determined by the rapidity with which the ball is moving, as also the point where it cuts off. Before the ball strikes the first wire a tuning fork is vibrated, and through a small opening in a diaphragm on one of the prongs a powerful beam of light is sent on the photographic plate. The vibrations of the tuning fork are exactly known. These make a sinuous stream of light beside the streak produced by the moving cannon ball. After development the plate is placed under a divided circle and a micrometer measures the revolutions of the photographic streaks. The movement of a ball two or three inches can be timed.

No photographic shutter with weight could be quickly enough moved. In the new invention the light from an electric arc impinges on two Nicols prisms lying at right angles to each other. In this position no light can pass through. But if a powerful current of electricity be passed through a coil placed between the prisms the light itself can be rotated without rotating the prisms. The electricity acts as a shutter, and as the current has no weight, it can be moved in an inconceivably short space of time.

### Machinery Notes,

—The Diamond Drill Company, at Birdsboro, Pa., are making a large number of prospecting drills for shipment to parties in India.

—We are pleased to note that large exports of American steel rails still continue. One of our recent orders comes from Ireland for 20,000 tons.

—In New York City there are not less than 5,000 passenger elevators in use, and in business hours it is asserted that more persons are carried vertically than horizontally. The elevator service is free.

—A machine for blowing glass jars has been invented and one is already in successful operation. When in general use it will displace about four fifths of the employees and will make glass jars cheaper than tin.

—With the assistance of the latest machines a piece of leather can be transformed into a pair of boots in thirty-four minutes, in which time it passes through the hands of sixty-three people and through fifteen machines.

—The Government of New South Wales has placed an order in the United States for 2,000 tons of steel rails of high carbon quality. The contract was readily undertaken at \$25 per ton. These continued orders for American steel rails are significant.

—An order has been received in this country for three tandem compound engines, side-crank type, for export to Spain. These engines are to be direct connected to electric dynamos, and were ordered by an English engineering firm for electric tramways at Barcelona and Madrid.

—Japan is about to place a contract in this country for the rails and materials required for the 1,200 miles of railroad which it is about to construct in Formosa, with the object of opening up to trade the phenomenal and as yet totally undeveloped resources of that formerly Chinese island.

—Japan is seeking to buy thirty more locomotives and 18,000 tons of track materials. It seems rather natural now for her to turn to America as a basis of supply, for there are building for her in the city of Philadelphia no less than twenty locomotives in addition to the large orders already filled.

—The Remington Machine Company, of Wilmington, Del., has just closed a contract for building an ice machine with a capacity of six tons per day for a firm in Para, Brazil. This is the third order the company has recently received from Brazil. Engineers of the concern are at present in Brazil erecting an ice-making plant which was shipped a short time ago.

—Advices received lately by mail from Havre say that orders for American steam elevator machinery will reach this market early next month, as a contractor in Paris in figuring for three elevators awarded his contract to either the Crane or Otis company. This order, as well as others in the same line, the advices say, will be sent through a Havre import concern.

MR. F. J. MILLER, editor of the *American Machinist*, recently spent some time abroad visiting the principal manufacturing centres of Europe and studying the interests of international trade. He wrote from time to time a series of very interesting letters from abroad upon the machinery trade as he found it in various parts. These letters were received with such interest on both sides of the Atlantic that Mr. Miller was induced to compile and publish the substance of his articles in an interesting and instructive little work entitled "American and Other Machinery Abroad." The book, which is a small, neat volume of ninety folios, contains a mine of timely and profitable information for both the users of machinery abroad and the manufacturers at home.

—The Waterloo Organ Company recently received orders for batches of organs to be shipped to London, South Africa and Australia. The wagon company loaded a large carload of carriages to go to Germany.

### Pennsylvania Railroad Standard.

INFORMATION has just reached us direct from Tokio, Japan, that the Japanese Government has finally adopted the 60 pound section, known in America as the Pennsylvania Railroad standard, for the 180-mile extension of the Imperial Railway upon which contracts are about to be awarded.

This action on the part of the Japanese Government will work in the interests of American mills, inasmuch as the sectional standard previously employed requires special rolls and additional handling of rails.

The Pennsylvania standard of 60 pounds to the section means that every yard of rail shall amount to 60 pounds in weight, this being about 96 tons to a mile of track. The choice was made after a close and expert comparison with the English standard and with all the standards in use on the principal roads of the United States. The Japanese Government's American engineer supplied his principals at Tokio with blue prints of all sections of American rails, and with details of weight and fastenings. The Pennsylvania standard, which has been selected, closely resembles the standard recommended for adoption on roads through the United States by the American Society of Engineers.

Hitherto the Imperial Railway has laid its tracks on the basis of the English section of rail, which weighs 61 pounds to the yard, with a simple splice bar. The English cut slots in the lower flange to receive the spikes to prevent "creeping," which is not considered good practice in America. Experience has shown that the rail is liable to break at the points where the lower flange is notched. In order to prevent this mischance, the chemical composition of the steel in the rail had to be made quite soft and low in carbon. It is in recognition of these defects that the new standard has been adopted.

It is expected that the contract for the addition to the Imperial Railway, requiring 18,000 tons of material, will soon be let, and it is hoped that it will come to the United States. Should it come, where every reasonable expectation looks for it to arrive, this country will have supplied Japan with nearly 40,000 tons of structural iron and steel within a year, exclusive of the steel warships now being constructed for that government.

A remarkable feature of America's part in the internal development of Japan is the immense number of locomotives that we have supplied. There are over 120 locomotives which were built, are building, or have been ordered during the year. Every one fetches \$10,000 on an average when delivered in Tokio; deducting freight charges, etc., at least \$1,000,000 remains in the United States as the consequence of its engine builders' successful competition with their European rivals. The awards of these important contracts, some complete, others under way, have been as follows:

The Rogers Locomotive Company, of Paterson, N. J., eighteen locomotives for the Imperial Railway, all finished and delivered.

Baldwin Locomotive Works, Philadelphia, eighteen locomotives for the Imperial Railway, all finished.

Baldwin's, twenty locomotives for the Imperial Railway, contract half completed.

The Brooks Locomotive Works, of Dunkirk, N. Y., twenty locomotives for the Imperial Railway, contract recently awarded, plans now finished and work begun.

Schenectady Locomotive Works, of Schenectady, N. Y., ten locomotives for the Imperial Railway, material in course of inspection and shipment to the works.

Schenectady Locomotive Works, twelve locomotives for the Kiushu Railroad of Japan, private corporation, contract finished.

Brooks Locomotive Works, four locomotives for the Ganetsee Railroad, private corporation, contract finished.

Baldwin Locomotive Works, twenty locomotives for the Nippon Railroad, private corporation, contract finished.

Baldwin Locomotive Works, in addition to these contracts, had several other engines to build for the Lanyo Railroad, a private corporation in Japan.

In view of the uniformly satisfactory work of American contractors, and in view also of the decision as to the standard of rail just announced, it is expected that the pending award for the material of the new section of the Imperial Railway will come to this country also.

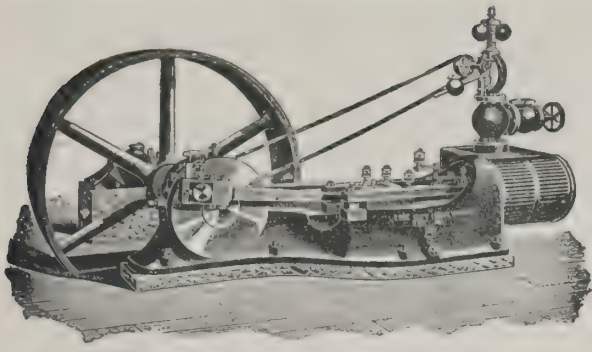
### A Substitute for Tanbark.

AMAN of Hudson, N. M., by name of Wulff, claims to have made a valuable discovery. There is an unpretentious tuber, the canaigre, which grows in New Mexico and Texas. Mr. Wulff claims that this tuber is a most desirable substitute for tanbark. If all that is expected of it is realized tanning is destined to experience a considerable change in the future. Speaking about the new product, Mr. Wulff said:

"The canaigre is a tuber similar in appearance to a turnip and a carrot. It grows from a piece of the old root planted in the ground, and is prepared for use in tanning in several ways. The most useful form is the extract, made by boiling the root and the substance derived thereby until it is thick when hot and becomes hard when cold.

"The root is also prepared for use by drying it as it is taken from the ground. The climate lends itself to that process. When dry it is sliced in thin pieces and is ready for use in tanning. In this condition it is used as a substitute for tanbark, and as such finds a ready sale in the East and in Europe, where the tanbark is scarce and high-priced."





# ERIE CITY IRON WORKS,

Established 1840.

ERIE, PENN., U. S. A.

## Boilers, Engines, Electric Motors.

Cable Address :  
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CAPACITY OF WORKS :  
300 Boilers per month.  
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Send for  
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Complete Lines or Variety.

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Moderate Prices.

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THESE FOUR POINTS OF ADVANTAGE WE OFFER THROUGH OUR CATALOGUES TO THE FOREIGN BUYER :

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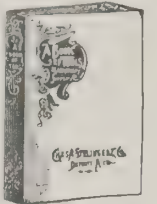
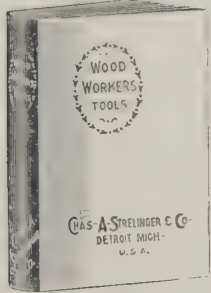
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We issue Two Catalogues : the first is called "A Book of Tools" and is a Metal Worker's Tool Catalogue, containing Small and Large Tools, Machinery and Supplies for Machinists, Engineers, Founders, Manufacturers, Miners, and all those using Metal Workers' Tools. It contains 550 pages, over 2,000 illustrations.

The second Catalogue is called "Wood Workers' Tools," and contains everything that is required in Wood Working from a Brad Awl to a complete Saw Mill. It is for Carpenters, Joiners, Pattern Makers, and all those who use Wood Working Tools and Machinery.

Either Catalogue will be sent postpaid to any address upon receipt of 25 cents to cover mailing expenses (foreign stamps taken).



Address Box 77. **THE CHAS. A. STRELINGER CO.,** DETROIT, MICH., U. S. A.



The introducers of stock dressed already for the brush,

And the only house making a specialty of

## TAMPICO or MEXICAN FIBRE

and mixtures thereof, put up in this way.



Also inventors of and dealers in

Special Machinery for Combing  
and Dressing Fibre.

CORRESPONDENCE SOLICITED.

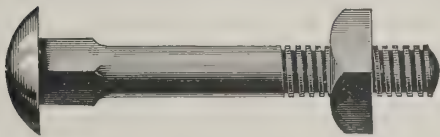


**E. B. & A. C. WHITING,**

BURLINGTON, VT., U. S. A.

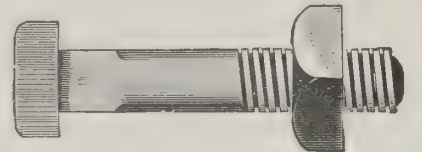
Carriage and Tire Bolts — Machine Bolts — Coach Screws — Stove Bolts.

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COLUMBUS, OHIO, U. S. A.



Carriage Forgings of all kinds.

The Largest and Most Complete Factory in America.

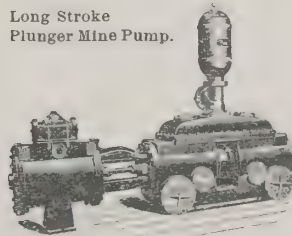
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Pumps for Every Service.

MINERS' SINKING PUMPS A SPECIALTY.

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Long Stroke  
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Duplex and Direct Acting.

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## The J. B. ALLFREE MFG. CO.,

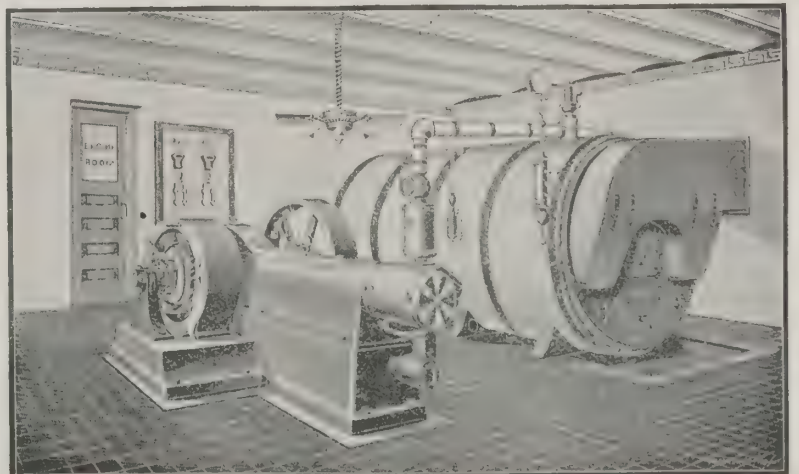
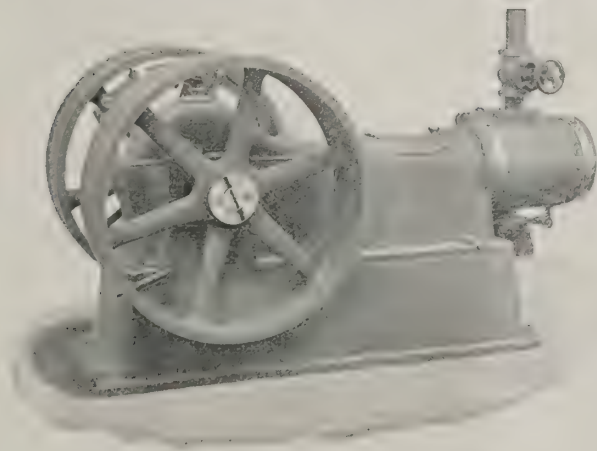
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### High-Grade Automatic Engines.

Centre Crank and Side Crank; Slow, Medium and High Speed; Simple and Compound; Condensing and Non-Condensing.

DIRECT CONNECTED  
DYNAMO ENGINES.

Automatic Lubrication.  
Write for our elaborately illustrated catalogue. State your requirements and we will submit estimates and prices.





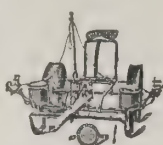
# MOLINE PLOW COMPANY,

MOLINE, ILLINOIS, U. S. A.

PLOWS, HARROWS, CULTIVATORS, PLANTERS, RAKES, BEET MACHINERY, Etc.



Wood Beam or Steel  
Beam Walking Plows.  
All kinds, all sizes.

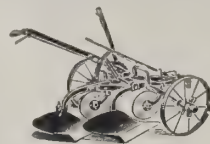


Moline Champion  
Corn Planter.



GOOD-ENOUGH  
SULKY PLOW.

Any Size  
Bottom on  
same Frame.



Flying Dutchman  
Wheel Walking Gang Plow.



"Kaffir Queen"  
Mealie  
Planter.

F. O. B. New York. Special Attention paid to the Requirements of Foreign Countries.

Foreign Agencies: JOHN & JOSEPH DRYSDALE, Buenos Aires, South America.

FLINT, EDDY & CO., New York City, for Australasia.

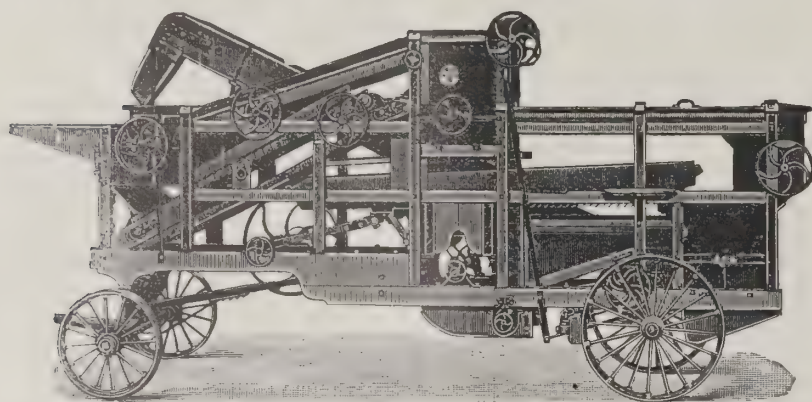
Mess. MALCOMESS & CO., East London, Cape of Good Hope, Africa, for South Africa.

Send for New Catalogue, either Spanish or American; also New Telegraph Code.

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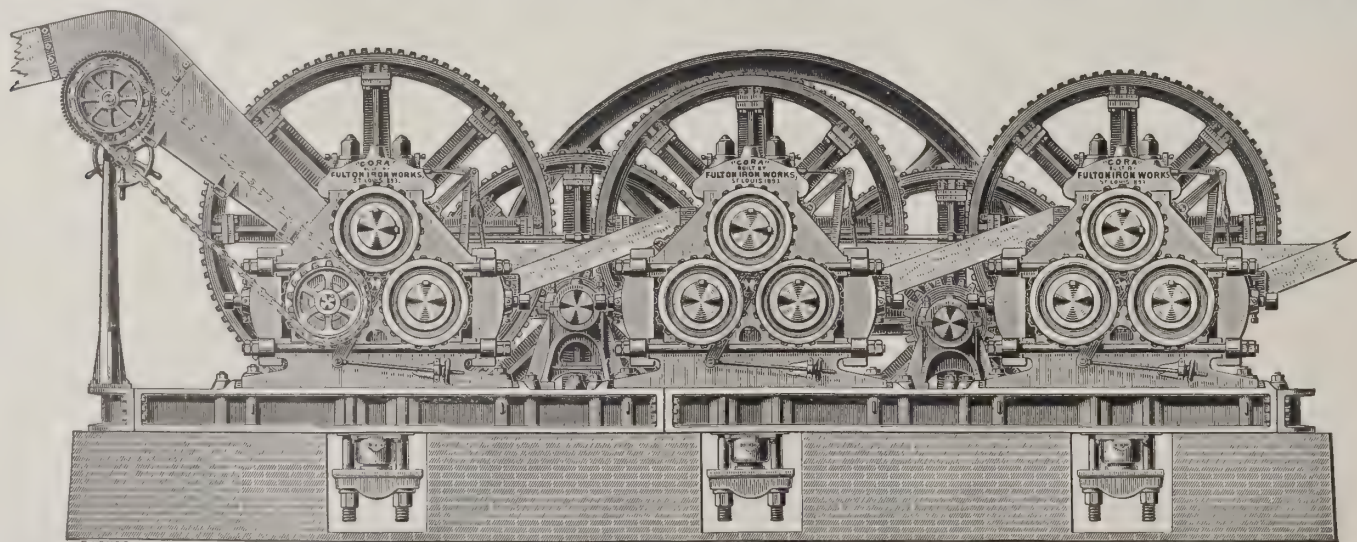


Thrashing Machines, Saw Mills,  
STATIONARY, PORTABLE AND TRACTION ENGINES,  
Horse Powers,  
Tubular Boilers and Iron Tanks

OF ALL KINDS AND SIZES FOR LOCOMOTIVES

Write us for DETAILS, PRICES and ANY DESIRED INFORMATION

## "CORA" Nine-Roller Cane Mill.



CORRESPONDENCE SOLICITED.

ESTIMATES FURNISHED.

Built by "FULTON IRON WORKS," St. Louis, Mo., U. S. A.

Per S.S. "COPTIC."

FULTON IRON WORKS, St. Louis, Mo.

HONOLULU, H. I., June 17th, 1895.

Dear Sirs: The nine-roller mill and Corliss engine built and erected for us by you last year has given perfect satisfaction, and we take pleasure in furnishing you with the following report covering work performed by it during the season just closed. Days grinding, 104 $\frac{3}{4}$ ; Tons of cane ground, 61,617.928; Tons of cane ground per day, 588.238. Extraction: 92.49 per cent. total sugar; 82.13 per cent. of cane; Dilution, 7.91 per cent.; Fibre in cane, 11.02 per cent. Average load on hydraulics, 313.2, 334, 344.5 tons.

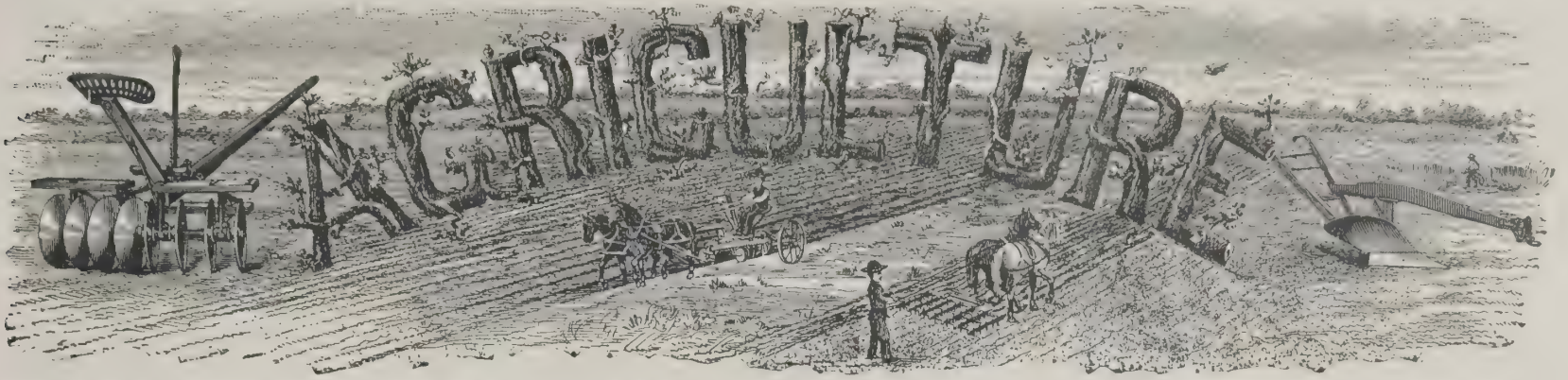
It is hard to say just what is the capacity of this mill, as our boiling house is not of sufficient size to admit of a prolonged test, but we would say that we have ground on a short run over 50 tons of cane per hour, and with an increase of from 50 to 75 tons in the load on the hydraulic obtained an equally good extraction. We believe we have the best mill on the Islands.

Very truly yours,

EWA PLANTATION CO.,

E. D. TENNEY, Secretary.





DEVOTED TO THE FOREIGN TRADE IN AGRICULTURAL MACHINERY AND IMPLEMENTS

### Millions in Cornstalks.

"AMONG the most remarkable manifestations of modern scientific progress," says the *Keystone*, "is the almost general utilization of what were formerly called waste products. Such a utilization of the cornstalk for various economic purposes now bids fair to become one of the gigantic wealth-producing industries of the country. The cornstalk has been hitherto practically a waste product. In the year 1895 it was estimated that fully 160,000,000 tons of cornstalks went to waste in the United States. The nutritive properties were not unknown to farmers, but they had no means of extracting the digestible ingredients, and in the great corn belt millions of tons of stalks were allowed to rot in the fields. It remained for one Mark W. Marsden to discover the gold mine that lay concealed in the neglected cornstalk. After much patient experimentation he discovered a way to extract the many useful ingredients, and the result was the formation of the Marsden Company, with an authorized capital of \$50,000,000, to develop the industry.

"The feed or fodder product of the stalks is a meal which resembles coarse bran, dried malt sprouts or brewers' grain. This meal, it is believed, will prove one of the cheapest and most nutritious foods for cattle, sheep and other live stock. It is said to be transportable and as capable of preservation as cottonseed meal, while it is more concentrated than hay, and is in such shape that it can be easily and uniformly mixed with any kind of ground grain. A careful investigation of its properties was made at Maryland Agricultural Experiment Station, and the report said: "The results of all tests made show the new corn product to be a valuable stock food. Animals fed upon such rations ate them with relish and kept in normal condition at all times. Cows and steers would lie down and chew their cud as naturally as when fed hay or in pasture."

But a product of the cornstalk which may prove more remunerative than the food above referred to is the substance known as cellulose, now in great demand for a variety of purposes. This cellulose is manufactured in granular form, and is then packed under pressure into the cofferdams of vessels. Corn pith has properties which seem to be admirably adapted for this purpose. It absorbs great quantities of water very quickly. The packing, if pierced by a projectile in a naval encounter, takes the water and swells with such rapidity as to close the hole before any damage is done. Cellulose derived from other sources, the coconut for instance, had been used for this purpose, and before the introduction of corn pith the cocoa cellulose was believed to be the best extant. The Marsden corn pith was brought to the notice of the Navy Department in the Spring of 1895, and soon after it was subjected to a competitive test with the cocoa cellulose. The superiority of cornstalk pith was demonstrated in a very striking manner, and it is said that the governments of England, France, Russia and Holland have placed orders with the Marsden Company.

"The possibilities of cornstalk cellulose are, indeed, practically unlimited. Tests have demonstrated that car journals packed with this material operate very satisfactorily, and, as packing is used in quantities wherever there is machinery, there is here alone a limitless field for its utilization. The Marsden Company's product is also thought favorably of as the principal ingredient of a fireproof insulating cement or paint. It will enter into the manufacture of paper and linoleum, and may supplant woodpulp. It may be molded into decorative panels, etc., like papier maché. As a non-conductor the cellulose and its allied products are said to be among the most perfect known. It therefore will have uses as covering for steam boilers and steam pipes, and as packing for refrigerators and cold storage chambers. Certain tests have been made indicating that after the elimination of the pith from the stalk, the fibrous portion remaining has saccharine properties which may prove valuable, and many other uses are suggested for the material, as in the manufacture of gunpowder, celluloid, tile blocks, etc.

"This is interesting news for the farmers, many of whom considered the despised cornstalk at times as a nuisance rather than valuable raw material and a source of gain, and we have the gratifying assurance that the corn growers this year have been favored with an excellent crop."

—The business of shipping fine draught horses from this vicinity to Germany is increasing, and nearly every week a lot is sent away by way of New York. Jacob Wallach shipped two carloads to Hamburg last week.

—American corn is in demand abroad as well as wheat. The shipments of corn during July, 1897, exceeded those of July, 1896, by 12,000,000 bushels.

If European cooks only knew how to make corn bread and corn cakes as do American cooks the demand for our maize would be amazing.

### American Flax.

SPECIAL-AGENT CHARLES R. DODGE makes a most gratifying report of the experiments conducted with American-grown flax at the Barbour mills in Ireland. A ton of flax straw grown in the Puget Sound region in the State of Washington in 1895 was sent to Ireland for experimental purposes. In the course of his report Mr. Dodge remarks, "That for flax culture the Puget Sound region is the equal in climate of some of the best flax-producing regions of Europe. The superior quality of straw produced, which resembled the straw of the famous Courtrai region of Belgium, attracted the attention of the Barbours, resulting in this firm undertaking the retting experiment in Ireland at their own expense.

"With the Barbour report was received a large series of flax, the best scutched fibre of which is valued by them at \$330 per ton. Out of this lot, however, flax was hackled that is worth 12 pence per pound, or about \$500 per ton. There is no doubt that a better quality of straw can be produced in this region, with experience, than that produced in the department's experiment. Only 1½ to 2 bushels of seed were used per acre, while in Belgium 3 bushels are often seeded per acre. In this experiment over seven tons of straw were produced upon five acres, and also about 70 bushels of salable seed. This experiment has demonstrated conclusively that it is possible to produce good fibre and good seed in the same plant in the face of the cry of importers and some of the Eastern mill men that the practice is impossible."

Mr. Barbour's own report closes with the strong statement: "If the flax is grown (and manipulated under proper conditions and by people who thoroughly understand the business we are convinced that the cultivation would be of the greatest importance to this country and in a short time would rival the great Belgium region of Courtrai. I wish to draw attention to the fact that the difference in wages between this country and Europe in flax culture is fully equalized by the cheapness and fertility of our lands, by the use of superior agricultural implements and by the larger amount of work that the American farmer is capable of performing."

### A New Beet Harvester.

A. PHILIP, a Stanton, Neb., man, recently gave an exhibition of a new beet harvester which he has invented, called the "Climax." The exhibition was witnessed by a large number of beet growers, all of whom pronounced it a success. The machine is so constructed that it tops and lifts the beets at the same time, carrying the tops and all rubbish away from the row and leaving the beets exposed to view and ready to be picked up and loaded into wagons. The topping is done by a knife on to which the tops are forced by a revolving wheel, both working automatically, so that beets standing deep in the ground or considerably above ground are topped with surprising uniformity. As the tops leave the knife they are caught by a shield or plow similar to that of an ordinary road grader, and carried to one side of the row. A double plow passes under the beet and lifts it to the surface. The machine did equally fine work in heavy beets, and where there was grass and weeds, as when there was none and the beets were light. Mr. Philip estimates that one of these machines will harvest from three to five acres of beets per day, and by its uniformity of topping and the fact that no beets are left in the ground, will save from 200 to 400 pounds per acre.

### Refrigerator Advantages.

THE free use of improved refrigerating processes has brought about much improvement in international trade in way of food supplies. By means of refrigerator cars and cold storage in ocean vessels a revolution has been effected in the distribution of food products. Frozen meat from Australasia is shipped to Great Britain in immense quantities, not less than 670,000 hundredweight finding its way over many thousand leagues of sea to British markets in 1896. Not less than 10,000,000 dozen eggs were imported from the United States alone by the same country. Frozen poultry has also become a factor in American exports, the hen roosts of the New World furnishing the hotels and restaurants of English cities. To these food supplies we have added American butter, some recent shipments from Iowa having developed considerable popularity and realized better paying prices than if sold in American cities. As being in charge of the world's larder we are in dispensable to the filling of its stomach.



### Export of American Butter.

THE Vernon Creamery has been selected by the United States Government to furnish stated quantities of butter which will be sent to England as samples to convince the English people, if any further proof be necessary, that good butter can be made in this country. As there is liable soon to be a surplus of the article the Government is making exertions to find a market in Great Britain. The butter will be sent in different-sized firkins and will bear no stamp of any kind.

The Secretary of Agriculture has also received complete reports from the third experimental shipment of American butter to London. This consisted of a lot of Minnesota creamery butter in 56-pound boxes and tubs, and a lot of Massachusetts creamery butter in small tubs, family packages and fancy prints. The export was made in June.

It cost  $2\frac{1}{2}$ c. a pound to carry the butter from Central Minnesota to London, by the single ton, with the best refrigerator accommodations all the way, excepting during short transfers. The transportation from Western Massachusetts cost rather more, because of the absence of a refrigerator car line to New York and the necessity of paying expressage.

The butter was all placed by the Department agent in London in the hands of retail dealers. They paid from 15c. to  $19\frac{1}{2}$ c. per pound for it, the same butter being then worth 15c. in New York. The wholesale price of Danish butter was about 20c. in London at that time. It was all retailed to consumers at 24c., 25c. and 26c. per pound, most of it at 26c. This was the same as the retail price of the best Danish, which leads the London market for salted butter.

The retailers upon being convinced of the high quality of American butter, paid the same price for it in tubs as in the favorite "Australian" or cubical box.

Six different dealers took the Minnesota butter at a uniform price of 18 1-5c. per pound. It cost about 16c., delivered to these London dealers. The Massachusetts butter was of equal quality, and although some of it sold to dealers at  $19\frac{1}{2}$ c., the small packages were not liked by the trade. This butter was worth 20c. for local sale in the neighborhood where made.

Thus, as in other cases, the Western creamery butter was sold at a fair profit, over 2c. per pound, while the New England creamery butter was sold in London at less than it would have brought at home.

The London retailers' margin for profit was  $6\frac{1}{2}$ c. to 10c. The consumer paid twice as much for the Minnesota butter as the creamery in that State received for it, and of what the butter cost the consumer the farmer who supplied the cream got less than two-fifths.

### Russia Investigating American Methods.

THERE are at present in the United States two representatives of the Russian Government who are inspecting farms and farming methods in the West and who are paying particular attention to the various kinds of agricultural machinery in use on the great prairie farms.

The commissioners, who are now in Iowa, have covered the agricultural States pretty thoroughly since May last and have gleaned a number of practical ideas. They have been much impressed with the experimental farms, which they will endeavor to introduce in their own country; and they admit that in this, as in other details, agricultural methods in America are centuries ahead of those in their native land.

The practical demonstration of the excellence of American implements applied to American products in cultivation will likely prove of interest and practical value to American manufacturers, who may look forward to the opening of a good trade in the Russian market—a trade which they could not only hold easily and securely, but which can be made the base of operations for an advance into other markets of Europe.

### American Fine Woods.

IT has recently been discovered that the barmaple wood grown in Washington is superior to any wood yet tried in the manufacture of small stringed instruments, such as violins. This is said to be verified by the practical experience and testimony of a well known Chicago instrument maker. He finds that the Washington maple is superior to any he has yet used, and he has heretofore been importing maple from the mountain regions of Switzerland as the best he could find in the world. The Washington maple seems to possess the qualities of being very difficult to split, capacity for satiny finish, resonance, strength and lightness in the superlative degrees. While the demand for such wood does not call for a great amount, it is steadily increasing and will almost command its own price.—*Wood Worker.*

—R. Frost, Avoca, Iowa, is about to ship his third car of butter to England. Reports from the first two cars indicate that the butter is regarded as superior to anything produced on the other side, and the price is said to be exceedingly satisfactory.

—An elastic horseshoe has been invented by Ellery C. Davis, of Crookston, Minn., which has its body constructed chiefly of rubber, and is provided with a metallic piece through which the nails pass. The principal point of advantage is that if used on horses it will render their tread on the streets almost noiseless. And if used in connection with the rubber-tired wagons so often recommended, and in some cases used, the city noises which are so intolerable to nervous people and the highly intellectual, will be in a fair way to be overcome.

### Deep Boring for Natural Steam.

THE deepest well in the world will soon be completed near Pittsburg, Pa. Already it is more than one mile deep and when finished it may reach down two miles into the earth. It is being bored in the interest of science. The object in penetrating so deeply is to determine just what the interior of the human footstool is like. From a commercial point of view the well was a success long ago. A comparatively few feet below the surface both gas and oil were struck in paying quantities, but the company owning the plant determined to dedicate it to science, and invited Professor William Hallock, of Columbia College, to carry on a series of temperature investigations as the hole is carried deeper and deeper into the earth. The results of these investigations are very interesting, and it is the opinion of several well-known scientists that the ultimate result of the boring will prove to be of widespread economic as well as scientific value. Most significant of all the facts so far ascertained is that the well grows steadily hotter as its depth increases.

It is the intention of the company to continue the boring process until something entirely new and original is developed. This may seem a crude way of putting the statement, but it has long been a theory among well men that if it is possible to go deep enough some new geologic condition or economic feature would be found to exist.

At the very least, they claim natural steam would be encountered, or the well walls would finally become so hot that water could be pumped down cold and pumped up in the form of steam, and thus the natural power of the future be obtained. At any rate, there is material for much speculation, and the interest becomes greater in increased ratio as the drill descends, and a startling event is expected to happen almost any day.

One remarkable feature of the well is that the gas found near the surface is now used to operate the powerful engines which do the drilling. Thus the natural power already issuing from the well is utilized for the purpose of deepening it.

### Manufacture of Mosaic Floors.

ACCORDING to a new process described in a late number of the *Yale Scientific Monthly* the manufacture of mosaic floors has been brought within economical accomplishment and satisfactory attractiveness. Small particles of wood, such as sawdust, wood flour and fine shavings, are treated first with a mixture of shellac and alcohol, and then with a cement made of curd and slaked lime, and while this mixture is still damp it is put into hot molds of the desired shape and size and placed under pressure; the joint action of the heat and pressure unites the wood most thoroughly with both the shellac and the cement, and after a few minutes the compound is taken out of the molds and completely cooled and hardened. Great care is necessary that no foreign substances, especially of an oily nature, be present, as this would prevent the cement from being absorbed into the pores of the wood. In making different colored mosaic the natural color of the woods used is taken into account, then the wood itself is dyed, and lastly dyes dissolved in alcohol are mixed with the shellac. The process is then performed as before. It is said that, notwithstanding its hardness, this compound possesses all the perfection of wood, thus rendering it of particular adaptation for use as a floor covering in the case of living rooms and private dwellings, and the important advantage is claimed for it of being unaffected by any changes of temperature.

### Five-Ton Electro-Magnets.

IF the five ton electro magnets in use in the Illinois Steel Company's works at Joliet prove a success when tested by long time larger sizes will be employed. When electric cranes are used in connection with them only two hand switches will be required to move iron or steel loads. Only four amperes of electricity at a pressure of 240 volts are necessary to give a magnet enough drawing power to lift a five-ton load. This is only about one-tenth of what is required to move a trolley car on a level. The magnets are in the form of the old-fashioned horseshoe. The poles are  $7\frac{1}{2}$  inches apart and are connected at the upper end by a soft steel plate 1 inch thick. The poles are each 10 inches long. They are elliptical in cross-section, being 24 inches deep by 8 inches in width. Coils of insulated copper wire cover the upper  $7\frac{1}{2}$  inches of each pole. Through this the current flows to a depth of  $1\frac{1}{2}$  inches. When a load is to be lifted the magnet is placed in position, the current turned on and the underlying metal is held fast. The crane then swings its load to a desired position and the current is shut off.

A USEFUL novelty in way of household utensils has been designed and perfected by an American inventor. It consists of a complete laundry combination for family use and is so constructed that it furnishes in a single portable plant a washing machine with stove connected, having a boiler and steam chest, wringer attachment, clothes tray, etc., so that it may be relied upon to wash, boil, steam, rinse and blue the clothes during the operation of laundering and by the aid of which the starch may be prepared, the irons heated and if found necessary even the dinner may be cooked, all upon one portable plant.

—A gentleman of Winchester, Va., lately received a cablegram from a London dealer offering \$3.50 per barrel for his entire crop of apples. He has not yet concluded to sell. He will have over 4,000 barrels.

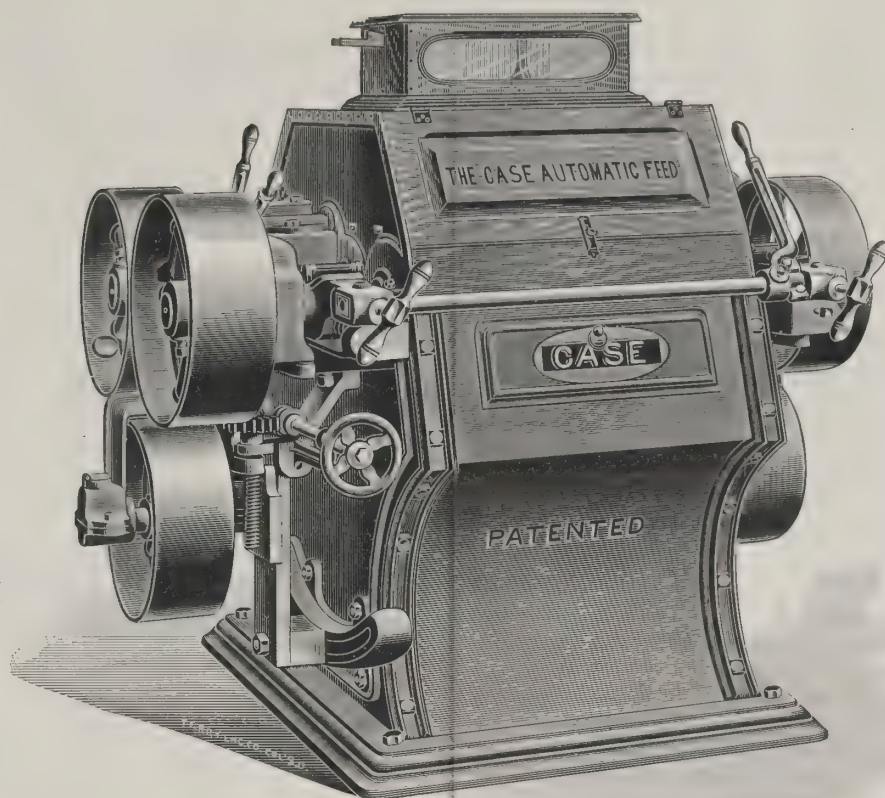


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Will make clean separations and grade in one operation.

The Monitor Coffee Milling Machine,

The most perfect miller for coffee ever offered. It will do the finest work on tender as well as hard coffees, and do it without waste or breakage.

These Machines are in successful operation in many of the largest Coffee Houses in this country, and are well worthy of investigation by Handlers of Coffees.

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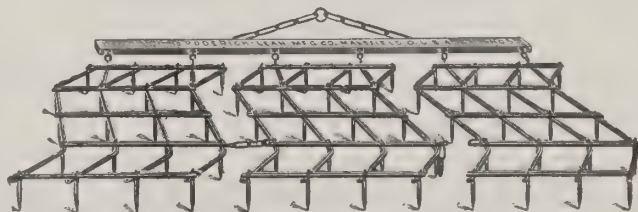
## THE LEAN ALL-STEEL HARROWS



RODERICK LEAN MANUFACTURING CO.,

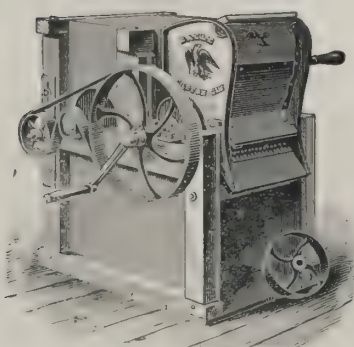
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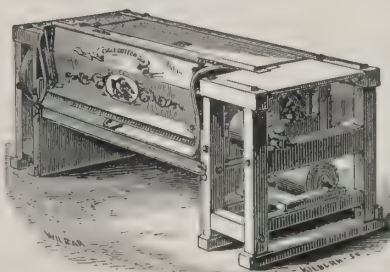
Mansfield, Ohio, U. S. A.

## EAGLE COTTON GINS.

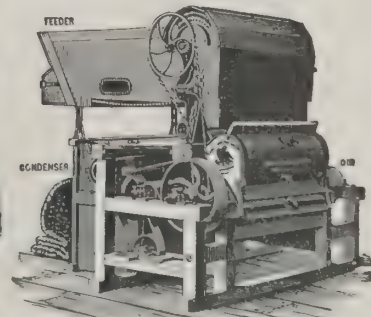


These Gins enjoy a BETTER REPUTATION THAN ANY OTHERS OF THEIR CLASS IN EXISTENCE, and are PREFERRED to all others made, on account of their STRENGTH, SIMPLICITY, DURABILITY, the amount and EXCELLENCE of the work they accomplish, and the RAPIDITY of their operation.

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Power Gin with 12-inch Saws.



Power Gin with 10-inch Saws, with Feeder and Condenser.

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## ELECTRICAL NEWS.

### Latest Development of Roentgen Rays.

THE largest and most powerful apparatus known for generating the X ray has just been completed, and is now on view in the laboratory of the College of the City of New York. Dr. R. Ogden Doremus, assisted by several other well-known surgeons of New York, gave the machine its initial test a few weeks ago and was enthusiastic over the results. The instrument is a massive affair, inclosed in a glass case 11 feet long, 5 feet wide and 9 feet high. It is supplied with eight revolving plates, which are 5 feet in diameter. These revolve on a 4-inch steel axle. Some idea of the power of this monster machine can be gained from the fact that the plates make 225 revolutions a minute. Relieved of their axis, and revolving on a level base, they would travel at a rate exceeding a mile a minute.

Dr. Gardner, of Washington, D. C., for whom it was constructed, is a specialist in lung diseases. He not only purposes to locate the seat of all ills which flesh is heir to by means of the X rays, but he will utilize the electricity generated by the machine to treat consumptive patients. A cage will be erected between the positive and negative poles, and in this the patient will be seated. He will first be rendered completely transparent through the powerful fluoroscope, and then he will be subjected to an atmosphere heavily charged with electricity. Dr. Gardner has a strong belief in the efficacy of ozone upon the lungs.

The effect of this was demonstrated upon a young man at the college. He was placed in a chair and the current was turned on, and although there was then no cage to retain the ozone the atmosphere, he said, experienced a decided change. Bolts of blue flame sprang from pole to pole, exploding with loud reports. A half current subdued the explosions and sent the flames zigzagging like streaks of forked lightning, the particles of dust in the air acting as stronger attractions than the opposite pole and deflecting the current from its course. The air became heavy and charged with a peculiar, dusty odor, such as one experiences during the progress of a thunderstorm, only much more pronounced. As a lung tonic Dr. Gardner claims this possesses remarkable virtues. It is, however, in its wonderful powers of penetration that the machine claims the greatest attention. After the test it was announced that, in addition to being the largest apparatus of its kind ever constructed, it undoubtedly possesses greater power—in fact, its possibilities are as yet only hinted at. The experiments so far were of a casual nature, and not calculated to show to what extent the machine can be used in surgery. But they did demonstrate that with an extraordinary tube, such as was then used, the human body, or any opaque substance of not more than a foot in diameter, can be rendered transparent.

After a few minor tests had been made, which were not beyond the possibilities of the ordinary X ray apparatus, Dr. Doremus placed his assistant in front of the machine, with the fluoroscope at his back. The room was completely darkened and the rays penetrated completely through the young man's body. His vital organs were exposed, and even the buttons on his vest were clearly distinguished. He next placed his two hands, folded one over the other, on his breast, and the bones of the outer hand were plainly visible through the body and through the hand nearer the body. All those present looked through the fluoroscope and all pronounced it the best result from the X rays ever attained.

### A Giant Dynamo.

THERE is now being constructed at Schenectady, N. Y., a dynamo for an electric-light station in Brooklyn which in point of mere size must be acknowledged to be the greatest of all dynamos.

From crown to base it will stand sixty feet, and is destined to produce electricity at a higher pressure or voltage than any other dynamo now in existence. It will be installed at Bay Ridge, near the opening of the Narrows of New York Bay on the Long Island side.

When Coney Island and other suburbs in Kings County were annexed to Brooklyn the Edison Illuminating Company began to prepare for distributing the electrical current through its territory, containing seventy five square miles. There were two ways in which this might be done. One was to erect small central stations wherever convenient to supply the surrounding area within a radius of one or two miles. The other plan, which was the one finally adopted, was to build a very large central station at tidewater and distribute the current from it at high pressure to substations, where it could be reduced to the low voltage suitable for the Edison system of arc and incandescent lighting. This latter plan had the obvious advantages of requiring a smaller number of men, of a more economical production of current from large dynamos, and of a great saving in the cost of transportation for coal.

The new dynamo, which is now almost completed, is only the first of several of similar size which are to be constructed. Its capacity may be judged from the fact that its output of current would be sufficient to keep 18,000 incandescent lamps burning at the same time. The pressure of the electricity as it leaves the dynamos will be 6,600 volts, or three times that of the great generators at Niagara Falls.

Nearly every one is now aware that a dynamo consists of two essential parts—the armature and the field magnets. The armature is made up of coils of iron surrounded by other coils of insulated copper wire. When a loop of copper wire is moved near a magnet an electrical current is set up in it. When a current of electricity is passed around a piece of iron it becomes a magnet for

the time being. In ordinary dynamos the armature is revolved on a spindle, while the field magnets are fixed. Sometimes the armature is ring shaped and made to revolve around the field magnets in the centre. But as the essential thing is that the field magnets and the armature should be constantly changing their positions with respect to one another, it is possible to make the armature fixed and cause the field magnets to revolve.

This is what has been done in the case of the Brooklyn dynamo. On the rim of a big flywheel, fifty feet in diameter, are placed forty magnetic poles, each pole being rectangular in shape and wound with insulated copper wire like a bobbin. Of course these poles are firmly bolted to the rim of the flywheel. On the inner surface of the big guard, which completely surrounds the rim of this flywheel, is placed the armature in forty triple segments, and these are all also firmly bolted to their frame. To make the iron masses in the poles magnetic it is necessary that they should have some of the current derived from the armature constantly passing through their coils. This is furnished by copper conductors, which touch copper rings on the axle of the moving flywheel, whence the current is distributed by insulated wires to each of the forty poles.

### Electricity at the Mines.

ELECTRICITY is now receiving considerable attention as an important factor in mining operations, and its services may soon be deemed altogether indispensable. Already its usefulness for light and power purposes has been fully established. At Rossland, B. C., a company has been organized to use the Middle Falls of the Koolinay River as a power source and to generate sufficient electricity to supply all the mines in that region. By this scheme it is expected that mining methods there will be revolutionized and that the cost of mining will actually be reduced at least one half. A start will be made with a 10,000-horse power. The limit of time allowed for the completion of the entire plant is four months, although it is confidently expected that everything will be in running order at least some weeks before that time. Nearly two hundred men will be employed in the construction of the plant, putting up the line and making the final preparations for the application of the power.

The charter of the new company is very broad, and while the main features cover light and power for the mines there apparently is no reason why electric railways should not be included in the scope of the undertaking, as they probably shall later on. This enterprise is but an offshoot of the great success now demonstrated at Niagara and soon to be duplicated at Massena on the St. Lawrence River.

### Tesla's Latest Invention.

NICOLA TESLA, speaking of his new invention whereby the earth's electricity is used for telegraphic purposes, said: "I am producing an electrical disturbance of intense magnitude which is continuing throughout the entire earth. In other words, I am producing a disturbance of the earth's charge of electricity which can be felt to the uttermost parts of the earth. This electrical disturbance, by means of certain simple instruments, can be felt and appreciated at any point of the globe. In this way messages can be sent the entire earth around and be taken up at any part of the earth without the aid or intervention of wires in any way at all."

He does not say, "I hope I can do this"; he says, "I have done it." Unless he is mistaken—and Tesla has never been found to be mistaken when he said he had achieved a thing—then the most wonderful and important stride in electrical development has been made. Its possibilities will not be confined to telegraphing and telephoning. It is the beginning of a great revolution in the industries and arts, and largely in commerce.

### Regulating Device for Incandescent Lamps.

AN ingenious device for regulating the intensity of electric lights, and one that will practically revolutionize the present incandescent lamp system, has just been patented. It consists of a diminutive switch, operated by a key placed in the side of the fixture, as at present, but by which five different degrees of intensity can be obtained. A slight turn of the key gives a faint pink glow to the wire, just about enough to show the location of the lamp in a dark room. Another half turn gives a little brighter light, equalling in intensity a shaded candle. From this up to the full brilliant white light any degree of illumination can be obtained by a slight turn of the switch, or the light may be turned fully on, or shut off, with one movement, as at present. In hotels the device will be of considerable value, as at present the hotelkeeper is obliged to run a dynamo and also have gas in every room, as many guests insist on having a faint light burning all night. The new device will save this additional expense of gas, and in hospitals, too, where dim lights are needed for the wards, the invention will be found of most practical service.

—A strange submarine craft was launched at the yards of the Columbian Iron Works on August 19th last in the presence of a large crowd of interested spectators. Miss Miriam Lake, daughter of the inventor of the strange craft, christened it in the usual manner as it glided from the ways into the water. This vessel, which is the invention of a Baltimorean, Simon Lake, is, as far as intentions and appearances are concerned, one of the most unique ever constructed. It is intended for commercial work, including the exploration of the bottoms of rivers, lakes, bays and even seas, for treasure seeking and other purposes of a kindred character. The vessel presents a curious appearance. The cigar-shaped hull has two big iron wheels attached to it near the bow. The Argonaut is thirty-six feet long and nine in diameter.

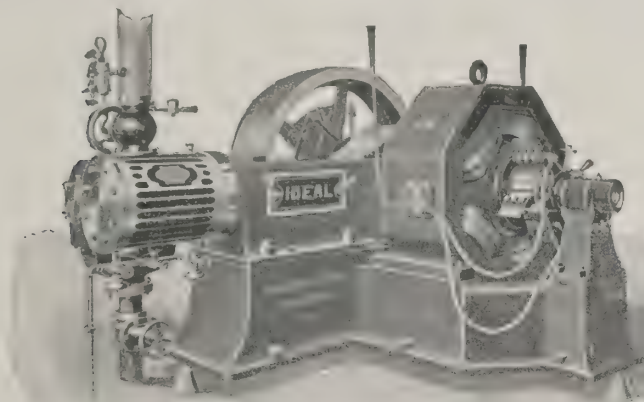


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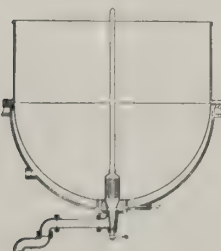
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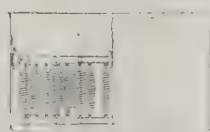


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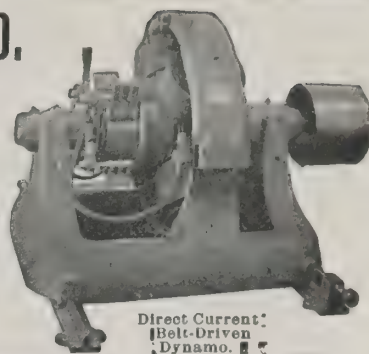
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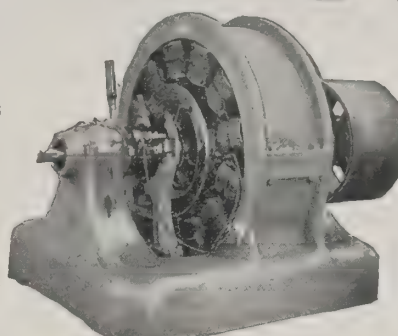


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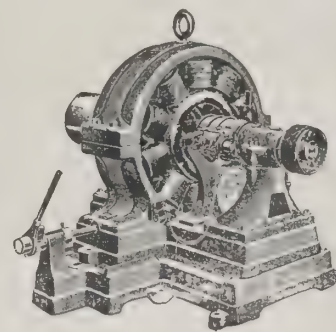


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for lighting purposes,  
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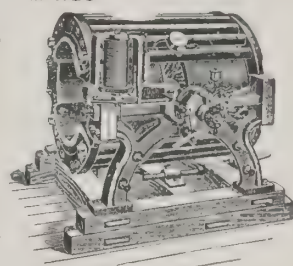
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ELECTRICAL APPARATUS ON ALL KINDS FOR  
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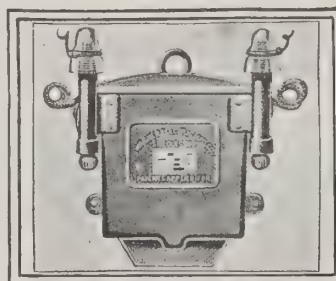


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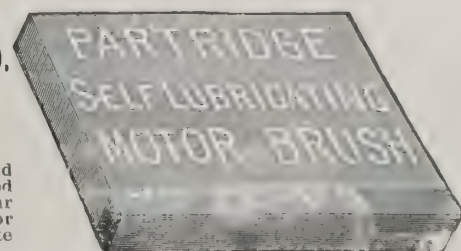
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**FRAME.** Best quality of weldless steel tubing is used. Main frame,  $1\frac{1}{4}$  inches; head,  $1\frac{3}{8}$  inches; lower rear stays,  $\frac{3}{8}$  inch, D shape, tapered to  $\frac{3}{4}$  inch; upper rear stays,  $\frac{3}{4}$  inch. Frame connections, such as crank box and fork crown, steel drop forgings.

**BEARINGS** in the Imperial are perfect, the cups and cones are turned from tool steel. All tempered and drawn; also polished to remove any roughness that may have been caused by tempering. HUBS and CRANK BOX barrel pattern. Hubs turned from bar steel.



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**SPROCKETS,** steel detachable, 8 and 9 tooth rear, 16 to 24 front.

**HANDLEBARS,** either wood or steel adjustable. Wheels, 28 inches, fitted with steel wire swaged spokes. Rolled thread. Rims, steel or wood.

**WHEEL BASE,**  $43\frac{1}{2}$  inches. Width of tread,  $5\frac{1}{2}$  inches. Crank Shaft, two-piece joined in centre.

**WEIGHT** about 24 lbs.

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**CRANK BOX.** steel drop forging. Balls are kept in place by ball retainers, which in connection with felt washers serve as dust shields. Oil caps are provided that deliver the oil direct to the bearings.

**PEDALS** are made rat trap, so constructed that rubbers can be attached.

**CHAINS.** We use a superior make. Pins hardened. Centres also hardened and drawn to straw color. Sides hardened. Gun finish.

## We also make High-Grade Tandems and Juvenile Wheels.

The Imperial Tandem represents the highest art of wheel building. The design is new and mechanically correct, the bearings perfect, making one of the strongest, neatest and lightest-running machines that can be made. It has many new features not found in any other.

The Juveniles have the same care in all details of construction as machines for adults, all Frame Connections, Hubs, Cranks, Etc., being uniform and in keeping with a well-constructed Juvenile Wheel.

### LIST PRICES:

IMPERIAL MODELS, 38 and 39, - - - \$75.00 each.  
IMPERIAL MODELS, 58 and 59, - - - 60.00 "

IMPERIAL JUVENILE MODELS, 8 and 9, - - - \$40.00 each.  
IMPERIAL TANDEM, - - - 100.00 "

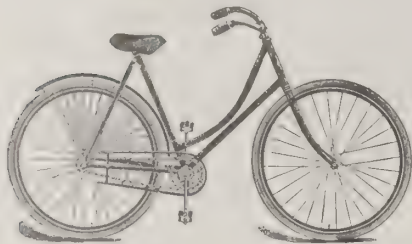
### OUR WHEELS ARE GUARANTEED TO BE ABSOLUTELY HIGH GRADE.

No bicycle is made in which better material is used or more care taken in the construction. Capital invested in the manufacture of bicycles, \$800,000.

Special Discount to Reliable Dealers.

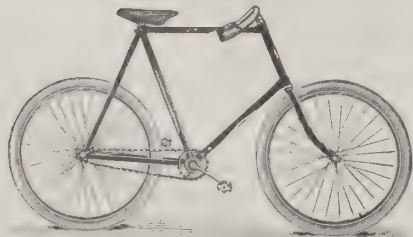
Correspondence Solicited.

**AMES & FROST COMPANY, "A,"**  
CHICAGO, ILL., U. S. A.



## THE BLACK MFG. CO., - ERIE, PA., U. S. A.

We build bicycles of the finest quality only and have nothing to offer either in cheap or medium grade wheels. Our discount for export is 30 per cent., and we deliver machines properly boxed f. o. b. New York. Order through your commission house and send copy of order direct to us.



**TRIBUNE MODEL 27.**  
Price \$100. Weight  $23\frac{3}{4}$  lbs.

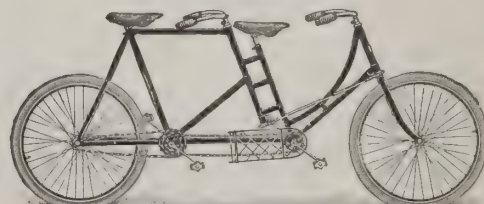
This is our standard men's wheel and is suitable for all kinds of road use. It is built in three heights of frames,  $22\frac{1}{2}$ , 24 or  $26\frac{1}{2}$ . The wheels are 28 inches diameter; 26 inches will be furnished if preferred. Gear, 68; options, 60, 63, 72, 73 or 80; cranks,  $6\frac{1}{2}$  inches, 7 inches if preferred. If not otherwise specified, all machines will be fitted with Hartford or Morgan & Wright tires. All wheels are supplied with tool bag, tools and repair kit. Regular finish, black enamel, nickel trimmings. If a lighter wheel than the above is desired, order should specify Model 21, which will weigh with light road equipment about  $20\frac{1}{2}$  lbs.

## Tribune Bicycles.



**TRIBUNE MODEL 24.** Price \$100.

Our ladies' wheels are built in three heights of frames,  $20\frac{1}{2}$ ,  $22\frac{1}{2}$  or 24 inches.  $20\frac{1}{2}$  inches is standard and will be shipped if not otherwise specified. Wheels, 28 inches, can be furnished, with 26 if preferred. Regular gear, 63; options, 56, 60, 68 or 72; cranks, 6 inches throw. The weight is about 24 lbs.



**TRIBUNE MODEL 23.**  
Price \$150. Weight 44 lbs.

Our tandems are also built with double diamond frame for use of men riders. Wheels are 28 inches; height of frame, 24 inches; ladies' forward frame,  $20\frac{1}{2}$  inches. Gear, 68; can fit with 72, 76 or 80, if desired.

The Celebrated  
Cycloidal  
Sprocket.  Used on  
Tribune  
Bicycles only





THIS DEPARTMENT IS DEVOTED  
TO THE FOREIGN TRADE IN  
CYCLES AND SUPPLIES.

### English Opinion of American Cycles.

OUR esteemed English contemporary, *The Ironmonger*, in a recent issue referring to the American cycle trade in Great Britain, has this to say: "The samples submitted to inspection comprise singles for ladies and gentlemen, and tandems, and from a cursory glance give the impression of being well-constructed and easy running machines. The system in vogue in the States of outside reinforcements is very much in evidence, in fact, a strong point is made of it in the specification, but although opinion is much divided as to the necessity of what may be described as exterior strengthening pieces, it must be admitted that through the character of the work in the mounts under notice the effect anyway is decidedly pleasing. Apart from tires and rim the makers affirm that they manufacture every part of the machines, and unless otherwise ordered, the cranks, pedals, saddles, etc., are the outcome of their own energy. A new and apparently simple chain device is fitted, and the advantages claimed for it over the old form are a perfect bearing for the axle, a positive adjustment, and one which enables the wheel to be removed and replaced without altering the adjustment of the chain. In the hubs the perforated flange has been discarded and a number of projecting lugs substituted through which the spokes pass. This enables the use of a straight spoke and leaves the wheel at a tangent. The handle-bar is of the adjustable form and the brake consists of a wood roller with a metal shoe over it, which is said to furnish great resistance to the wheel without wearing the tire. Single tube tires, known by the name of 'Kokomo,' are supplied as a regular equipment, but Morgan & Wright and other makes can be fitted if desired. The machines are manufactured in high-grade quality only."

### A Bicycle with Pneumatic Hubs.

A YOUNG machinist, Harry R. Collins, of South Bethlehem, Pa., has patented an invention which, in the opinion of the Commissioner of Patents, army officers and the limited few who have seen it, will revolutionize the bicycle. The device has been perfected for some little time and patents secured by the inventor in every country issuing such papers. The inventor until two years ago was in charge of the largest and most important machine in the ordnance department of the Bethlehem Iron Works, where the great guns are made for the Government, and is a thoroughly skilled mechanic.

The result of an accident to his wheel which punctured the tire first set Mr. Collins to thinking until he perfected his very practical idea. The main feature of the invention is abolition of the pneumatic tire and its substitution by one of hard rubber which is, of course, non-puncturable. To obtain the required resilience there is a pneumatic hub. Around the axle, protected by steel thimbles, so that there is absolutely no wear on the rubber, is a pneumatic tube, blown up the same as pneumatic tires. This tube is incased in a nickel-steel frame, to which the spokes are attached. The frame, hanging on these inflated hubs, causes the rider to rock easily, as though he were sitting in a swing. There is consequently the least possible vibration. When the wheel runs up against or encounters an obstacle the pressure of the frame forward is against this inflated tube in both hubs, so that it simply springs and swings as it were without jolt or jar. At the same time it makes riding easy and saves the frame from the wear and tear of constant concussion.

Mr. Collins has taken out in all seventeen patents for various devices in connection with his bicycle, all of which have been granted in England, Germany, France and Canada. The tire is not cemented to the rim but is spliced on the inside, so that it fits snugly in grooves cut into the wood. It cannot possibly become loose, shift or tear off, but remains firmly in its place until worn out, a matter of at least two years of hardest usage.

The wood rim, also covered by one of Mr. Collins's patents, is cleverly constructed. It consists of three kinds of wood, in three sections, so closely spliced as to conceal the joints. These rims are so strong that without the wire stringing they will bear the combined weight of two ordinary persons with scarcely a deviation from their circular shape. The spokes are of a material which can be bent, twisted and tied into knots like twine without breaking and are so

strung that the pressure and weight are never borne by less than four of them at a time.

Other patents cover certain sections of the hub. One relates to the cap holding the ball bearings, another is for a cap to the nut holding the oil so that a machine ridden every day need only be oiled at long intervals. The pneumatic tube in the hub is so well protected that there is absolutely no wear and tear upon it, hence there is little likelihood of its becoming out of order, and it is designed to last about three years—the ordinary life of all rubber goods—before they begin to harden and crumble away.

A few weeks ago the inventor gave a private exhibition of his new wheel to a party of about a dozen representative men. After explaining his invention, and showing the peculiar mechanism used in its construction, the wheel was ridden recklessly over ditches, rocks, logs and broken glass without any perceptible damage to machine or rider. One of the ditches measured 21 inches deep and a log crossed three times at full speed had a diameter of 18 inches, and yet the rider, a man weighing 180 pounds, kept his seat, rocking easily in the saddle. It would seem as though the machine could be ridden at full force against a stone wall without disturbing the equilibrium of the rider. The development and marketing of this machine will be watched with great interest.

### Small Sprocket Wheels.

IT is a mistaken idea of some bicyclomakers that they are catering to the interest of the riding public by reducing as far as possible the size of the sprocket wheel or the rear axle so as to give lightness to the parts of the machine. That this is a mistake is proven by an experiment recently made to determine the comparative efficiency of sprockets of different sizes. To carry out the experiment the bicycle was inverted, and the frame securely attached to the floor. A thin steel band had one end attached to the tire, and the other end carrying a weight, which was raised by the band being wound upon the tire, a second weight being hung from a scale pan attached to the pedal, whence the efficiency of the portion of the mechanism transmitting the power could be calculated. A long series of readings were taken with the same large sprocket and with seven, eight and nine toothed sprockets on the rear, and with pedal weights varying from two pounds to fifty pounds. The average efficiencies in each case were as follows: 7 tooth, 89.9; 8-tooth, 91.5; 9-tooth, 93.4. This shows the 8 tooth to have 98.9 per cent. of the efficiency of the 9 tooth, and the 7 tooth to have 96 per cent. of the efficiency of the 9 tooth sprocket, other conditions being equal. The result proves that there is less chain pressure upon the teeth of the larger wheels, and hence less wear.—*The Engineer*.

### Bicycle Tools.

A SUBSTANTIAL and pleasing tribute to American machine tools is paid by *Engineering*, of London, one of the greatest technical journals of Great Britain. The following is an extract from a recent issue of that paper. "It is not a reassuring thing for those who would see the engineering supremacy of this country maintained to notice how certain American firms have ranged ahead of us in the production of a light class of machine tools of which bicycle-making machines afford an example. At the present time with the demand for bicycles still great, and new factories being started constantly, manufacturers have the greatest difficulty in obtaining the special plant. It is easy enough to purchase ordinary lathes, milling machinery, power mills, etc., but with these the bicycle maker cannot hope to produce his wares at anything like the same speed or at so low a cost as can those who are fortunate in possessing special labor saving and extremely accurate tools. No doubt a good many ingenious cycle making tools have been constructed in this country, but these have been largely designed by the cycle makers themselves—when they happen to have been mechanics also—and have not been put upon the market. Under these circumstances the American makers have stepped in, and are at the present time reaping a rich harvest in selling, pretty well at their own prices, special cycle-making machinery of a nature which cannot be purchased from British manufacturers."



## Levers vs. Cranks.

MANY inventors have tried to replace cranks with levers, multiplying the energy developed by combining it with gearing, toothed sectors, etc., says *Le Practicien Industriel*. Up to the present time these attempts have not been successful, for it is wrong to think that a lever arrangement will increase the dynamic effect of a machine. On the other hand, from a standpoint of saving in work, the use of a lever is an illusion, because the power must be equal to the resistance at the end of each period of motion. When this was established two machines were compared, one with cranks and the other with levers, each having the same gear.

With the first machine the relation of the lever arm of the power to the resistance was about  $\frac{16}{8} = 2$ ; therefore the pressure on the pedal is multiplied

by 2. In the second the same relation is  $\frac{56}{16} = 3.5$ , the effort being multiplied

by 3.5. There is, then, in favor of the levers a gain of  $\frac{3.5}{2} = 1.75$ . But it must

not be forgotten that, according to the lever theory, the equation of the equilibrium must be satisfied; therefore, the distance run with 1.75 times less effort will be 1.75 times slower and no saving of fatigue at equal speed.

The revolving motion of the feet is changed into an alternating ascending and descending motion. In ordinary walking there are two distinct pendulum motions—that of the thigh around the hip joint and that of the leg around the knee joint. The lever and crank motions do not compare with the pendulum motion. In both cases the knee describes the same arc of the circle; but in the first the foot rises and descends, following a curve of  $13\frac{1}{4}$  inches of the large diameter, so to speak, perpendicular to the horizontal, while in the second case it describes a circumference  $12\frac{3}{4}$  inches in diameter, the oscillation of the lower part of the leg around the knee joint simply being reduced from 30 to  $12\frac{3}{4}$  inches, while it does not exist in the lever motion. The latter can be compared to military mark time, the crank motion being more like ordinary walking. With a lever machine, as will be seen further, the foot travels over a curve of greater diameter and then ascends according to this line; in the crank machine it travels over a half circumference; in the first case the line of work is equal

to  $13\frac{1}{4}$  inches; in the second to  $\frac{11 \times 12.75}{2} = 6.37511$  20.02 inches; the gain

for the levers is  $20.02 - 13.125 = 6.89$ , or  $\frac{6.89}{20.02} = \frac{1}{3}$  nearly; to maintain this

advantage it must be admitted that at an equal amplitude the alternating motion is less fatiguing than rotation, which is not true.

It may be remarked that the muscular effort to be developed is absolutely the same in both machines, the weight of the body not entering as a factor; it is evident that when sitting the body rests upon the saddle and not upon the pedals. By taking a slight support on the saddle the difficulty and fatigue of running will be felt. The lever motion presents the same disadvantages for wheelwomen as the crank motion; in fact, the inconveniences only result from the motion of the thigh round the hip joint, which absolutely depends upon that of the knee, or, as has been seen in both systems, the knee exactly describes the same arc of the circle; it occupies exactly the same place when the foot is at its highest and lowest point. This is because the greatest separation of the pedals is the same in both machines, the motions of the thigh being identical and the resulting disadvantages are equal.

Briefly the lever machine has no advantage over a crank machine and the motions of the legs are less rational.—*Exchange*.

## A Pneumatic Saddle.

PNEUMATIC saddles are growing in popular favor. Certainly they appear to have a decided advantage in that they can be made hard or soft at pleasure. At the rear of the pneumatic saddle is a small tube making the air connection between the two air cushions. Only one valve is required to inflate them, and the pressure remains equal in both. There is no rolling from side to side, as the air passes slowly through the small tube. This is said to be the secret of the success of the air cushions in service.

The central bar is of hard wood, and is securely screwed and glued to the soft wood plate forming the bottom. The grain of the wood plate crosses the bar. Bolts pass through both, and with the steel fastening or spring on the bottom are securely drawn together, making them practically indestructible. A soft felt edge covers the outer edge of the wood plate and pommel, forming a dish-shaped bottom for the rubber air cushions to rest in. They ride well, even when the cushions are deflated. The cushions may be removed and replaced at will when they are deflated. A brass strip that is nickel-plated is screwed to the back, holding this opening securely closed. Another strip is screwed through the centre between the two cushions, making a substantial and neat finish. The binding strips, being of brass and nickel-plated, cannot rust.

The advantage of the air cushions is that they cannot pack hard after long use, as is the case with felt or hair, and thus are comfortable as long as the saddle is used. The saddle is inflated like a bicycle tire, and the valve is the one generally found on tires. By keeping the cushions so that they can be jammed with the fingers the effect of a spring is secured without the undesirable features of a spiral spring under the saddle.

## Export Trade in Bicycles.

PREVIOUS to the fiscal year 1896 the export trade in American bicycles was so insignificant as to claim no classification in the statistical reports of the United States. Since then, however, in spite of the keen competition abroad, it has attained an importance that gives it a special place in the table, and for the fiscal year 1897 the figures represent \$7,005,323.

	Fiscal Year 1896.	Fiscal Year 1897.
United Kingdom.....	\$613,292	\$2,375,675
Germany.....	145,892	1,006,346
France.....	108,414	262,606
Other Europe.....	214,697	1,199,214
British North America.....	496,598	730,067
Mexico.....	24,278	73,117
Central America.....	47,781	56,801
Cuba.....	5,766	4,016
Puerto Rico.....	7,929	4,120
Santo Domingo.....	266	4,908
Other West Indies and Bermuda.....	19,915	132,607
Argentina.....	4,065	42,091
Brazil.....	13,592	29,355
Colombia.....	23,012	24,290
Other South America.....	13,401	73,507
China.....	4,669	18,400
British Australasia.....	8,610	692,894
East Indies, British.....	2,392	18,316
Other Asia and Oceania.....	59,834	113,577
Africa.....	7,609	25,979
Other countries.....	....	217
	\$1,898,012	\$7,005,323

## A Family Bicycle.

ALONG the endless chain of inventions and improvements on bicycle structure and accessories is one by a New York man who has perfected what he calls a family bicycle. The new invention, properly termed, is an adjustable bicycle frame, and if it possesses a third of the advantages claimed for it will prove to be a radical improvement in cycle construction. The frame differs little in design from those now in vogue, save that it is practically devoid of brazing. The connections are made by means of adjustable inner tubes and screws and are light, strong and simple. The easy manipulation of the screws will change the frame to any size desired, so that in a half minute it may be made to fit any rider. The frame can be lowered to suit a short boy or raised to accommodate a tall man. The wheel base can be lengthened or shortened in the same manner. The crank hanger also can be raised or lowered to any point desired.

If a woman wishes to ride the machine in skirts the upper main tube can be lowered so as to convert it into a drop frame bicycle. Withal the wheel is devoid of complications, and the style of connections adds to rather than detracts from its appearance. Among the advantages claimed for this frame are that it will no longer be necessary to construct bicycles in different sizes, that one bicycle will do for the use of an entire family; that the adjustability of the crank hanger will render it equally available for track and road use, and that in case of injury any part can be replaced without requiring an entire new frame. Another advantage is that it can be taken apart quickly and packed in a box 30 inches long and broad by 10 inches deep. The chain adjustment permits the chain being tightened, loosened or removed within a few seconds of time. The inventor claims that in lightness, strength and rigidity his machine compares favorably with any on the market.

## Wood Rims for England.

IT is evident that the American wood rim is steadily finding favor in England, and English makers are beginning to adopt them largely in preference to iron, which has long been extinct in this country. When they first came out here we were skeptical of success, but it did not take long to demonstrate their superiority. Besides making a better appearance they were found to be lighter, stronger and more durable.

The appearance of Dr. Doolittle, of Doolittle brake fame, in Cleveland last month created a mild sensation and considerable talk among the trade, especially when it became known that that gentleman, who represented several great bicycle manufacturers of England, intended to place a contract for a large supply of wood rims.

The Doolittle Brake Company is practically owned by the Rudge Whitworth, Swift and Singer companies, and hence Dr. Doolittle, who came to this country on business for his own concern, was intrusted with the mission of buying rims for them. After looking the ground thoroughly over Dr. Doolittle placed an order for over 100,000 rims with the Keene Wood Rim Company, of Keene, N. H. While it is hardly to be expected that wood rims will be used exclusively during the coming year by the English concerns, it is evident that American competition and progressive ideas have forced them into up-to-date methods, and unless otherwise ordered wood rims will be fitted to all wheels manufactured by them next season.

—A family tricycle has just been ordered from a Reading manufacturing concern by an enlightened resident of Zanzibar, Africa. These cycle carriages are three wheeled conveyances supplied with seats so that a man can take his wife and heirs out for a ride, he furnishing the locomotive power. Model husbands, those Zanzibar Islanders!



# Hunt

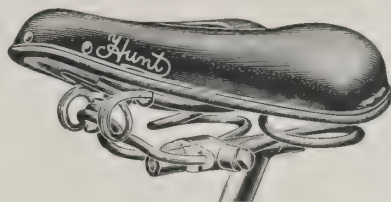
## Saddles Are Famous the World Over

FOR THEIR

SUPERIOR QUALITY, DURABILITY AND COMFORT.

SEVERAL DESIRABLE NOVELTIES WILL APPEAR  
IN THE PATTERNS FOR 1898.MARKT & CO., Ltd., Hamburg, London, Paris and New York,  
European Agents.

Send for Catalogue showing many different patterns.

The felt pads are supported on a laced  
framework of tough but elastic leather  
thongs.

### HUNT M'F'G CO.

WESTBORO, MASS., U. S. A.



**SYLPH**  
BICYCLES  
BOLTLESS

RUN  
EASY

\$100.



1898 MODELS NOW READY.

## "Boltless" SYLPH and OVERLAND Cycles.

You will lose money if you contract for your '98 line before getting our prices.

It has been demonstrated throughout the entire season of 1897 that SYLPH and OVERLAND Cycles are simply without equals, while the '98 output of our factory will be as far ahead of our '97 goods as can be imagined. There will be no other bicycles made for '98 that can compare with SYLPHS and OVERLANDS for

Reliability, Durability, Ease of Running, Grace of Outline and  
Beauty of Finish.

OURS IS A COMPLETE LINE.

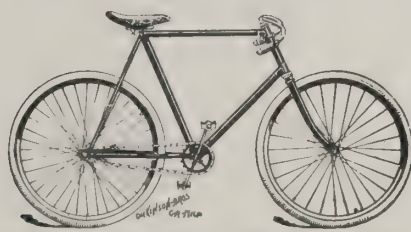
'98 SYLPHS, \$75.—22 lbs.; Heights of Frame, 21, 23 and 25 inches. For ladies, 20, 22 and 24 inches.

'98 OVERLAND SPECIALS, \$60.—24 lbs.; Heights of Frame, 21, 23 and 25 inches. For ladies, 20, 22 and 24 inches.  
(Guaranteed equal to any other, excepting our Sylph, no matter what the price.)

'98 JUVENILE OVERLANDS, \$40.—24-inch wheels. Extra fine TANDEMS, \$100; list.

OUR NET PRICES WILL PROVE ATTRACTIVE. Largest Experience. Established 1864. Best Facilities, Best Goods.  
Lowest Prices. Write Us.

## ROUSE, HAZARD & CO., Manufacturers,

PEORIA, ILLINOIS,  
U. S. A.

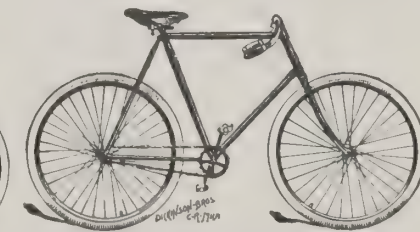
Halladay Roadster, \$100. Discount, 45 per cent.



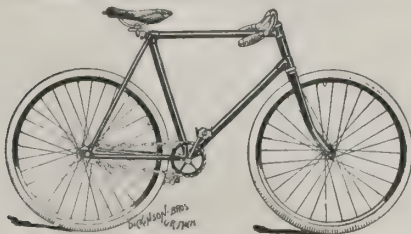
Lady Halladay, \$100. Discount, 45 per cent.



Lady Aetna, \$75. Discount, 50-55 per cent.



Aetna Roadster, \$75. Discount, 50-55 per cent.



26-inch Boys' Aetna, \$50. Discount, 40 per cent.

### MARION CYCLE COMPANY,

MARION, IND., U. S. A.

The Largest and Most Complete Line of Bicycles  
made in America.

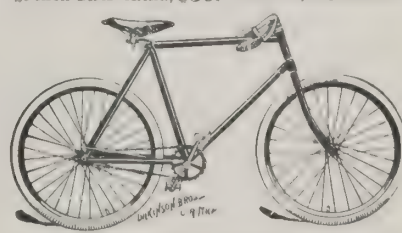
## Halladay AND Aetna Bicycles

Strictly of the Highest Grade.  
Absolutely Guaranteed.Prices quoted with discounts are our BEST and cannot be beat for quality off. red.  
In refer to largest dealers in America. Complete line for reliable service. Orders ac-  
cepted through reliable commission houses. Mail exact copy of order direct to us  
Direct orders must be accompanied by Draft on New York or San Francisco. All goods  
carefully boxed for ocean shipment, F. O. B. New York; or delivered San Francisco or  
New Orleans, \$1.00 net extra per machine. Send for Art Catalogue mailed free.

26-inch Girls' Aetna, \$50. Discount, 40 per cent.



24-inch Girls' Aetna, \$40. Discount, 35 per cent.



24-inch Boys' Aetna, \$40. Discount, 35 per cent.



### American Bicycle Inventions.

—A simple wall support has been the joint invention of John C. Crisp and James C. Smith, of Elyria, Ohio. The arm swings up or down in the ears of the base plate, and the outer end with its spring jaws is swivelled. This latter permits the jaws being clasped over any convenient part of the frame when it is desired to use it.

—Charles Wooster, New York, provides for a tilting bar on a seatpost by splitting the top of the post and setting in this a pendant flange made with the bar. This flange is corrugated and engages with a loose disk, which is placed in a side lug extending from the seatpost. This disk is forced into engagement by a lever bolt screwed into the side lug.

—A method of raising or lowering handlebars, but one which can hardly be said to be new, is accomplished by use of a ratchet where operated by a handle and held in a locked position by a pawl. At the back of the stem is a groove into which extends a feather held in the back ears of the clamp. This latter, in addition to the ratchet, prevents the stem from twisting.

—A bicycle support, the invention of Arthur S. Lange, of Salem, Mass., consists of an apparatus to be attached to either the floor or wall, and which is capable of considerable adjustment. The loop and base are connected by a swivel piece, the connections being held by thumbscrews. A locking pin passes through the basepiece into the swivel plate. When it is desired to swing the wheel round close to the wall this locking pin is raised and carried to another pocket.

—Hugh Muir, of Chicago, is the patentee of an adjustable handlebar which does away with locking devices to secure it in its different positions. The upper end of the stem is threaded, and fitting these is a nut with a knarled edge for convenience in turning. This nut has a groove above the knarled part in which fits a two-part collar, the ears of parts being connected with the handlebars through links. The handlebars are in two parts pivoted to the top of the stem. By turning the nut the bars are raised or lowered through the means of the links.

—Beginners will be pleased with an invention, which promises to make the way easy for them. It is a support invented by James Judge, of New York. Attached to each rear stay by means of clamps is a short arm having a hub, the face of which is provided with a toothed ring. Locking with this is a similar hub carrying a long arm provided with a ground roller. The short arm and serrated hubs give ample latitude for adjustments to any position. By means of this device a novice can keep his equilibrium until he has gained that confidence which only can assure him a perfect balance.

—A means for changing the gear or holding it at rest is provided by a rather clever invention of Wells T. Barker, of Nashville, Mich. The device works by means of a sliding cylinder within the hanger box. This cylinder has at each end one of the cranks and is controlled by a shifter, pivoted to the seat-mast, the operating arm of which extends through the hanger to operate the cylinder. The sprocket wheels are fixed to the hanger, thus requiring the pedals to be thrown over from the centre. This shifter is connected by wires to a T-lever, which is pivoted to the frame back of the head. This lever has a sector plate, which locks the three different positions, viz., rest, high gear and low gear of the cylinder.

—A patent for a self-sealing tire has been granted to Sola B. Dun, of Chicago. There are two modifications of this device. In one the inner tube is provided with a pocket, which is to contain a clotting fluid for closing a puncture when the cause has been removed. In the second method the inner tube is provided with two pockets, the outer one of which contains the puncture-closing fluid and the inner one some suitable powdered substance to combine with the fluid. Inside of all is shown another fluid to combine with the powdered substance. Wires are also shown in the tread of the outer casing to prevent to a degree punctures and the enlarging of them. The first shown would have value, but the second would prove too heavy for ordinary use.

—Samuel Kohn has perfected a fastening to be employed in lieu of the lacing commonly used to close the slit in casings of tires. Two spring metal plates are used, one at each side of the slit. Each of these has guides, those on one side serving to control a slide bar in its movements, while the oppositely placed guides act as locks for the bar when the slit is closed. To operate the slide one end of it is provided with a stud, which engages with an eccentric slot in a lever, the pivot of which further serves to lock the two plates together at one end. By moving the lever out the slide-bar is moved to release its hooks, the contrary movement locking them. The device in itself is clever enough, but will not be as flexible as it should be to permit of the inner tube being handled easily. Manufacturers have been offered devices of this sort, but object to them because they are made of metal.

### Want American Material.

ENGLISH cycle factories are coming to America for material. Edward Jones, a representative of the "Kynoch Limited," of Birmingham, has come to purchase cold drawn steel to be used in the manufacture of bicycles at the Birmingham works. He has a letter to President C. M. Schwab, of the Carnegie Steel Company, and will visit the works of that company.

Mr. Jones was sent to this country to buy both machinery and material. The machinery to be used in making bicycles he will obtain in various Eastern cities. The Kynoch Limited is the largest firm of the kind in England. It employs 2,500 men at Whitton, a suburb of Birmingham, and makes all kinds of ammunition, but has recently added a bicycle factory.

### Water-Tight Doors.

AN invention of great interest to the shipbuilding trade is that of a water-tight door for bulkheads. The United States Government is so greatly interested in the subject that it has commissioned the inventor, Mr. William B. Cowles, who was formerly an engineer in the United States Navy, to install his system of water tight doors in the bulkheads of the cruiser Chicago, now undergoing a course of alterations and repairs at the New York Navy Yard.

In order to make a successful experiment a bulkhead had to be built, in which a sliding door is operated by hydraulic power from a central point, with indicators to show just in what condition the door is at any given time or stage of its opening or closing.

Fully one third of the cost of a vessel is spent in making her unsinkable by the aid of bulkheads and double bottoms, but in nearly every one of these one or more openings are made, supposed to be closed by water-tight doors. The question of water-tight doors has always been one of the utmost importance in shipbuilding, and many constructors argue that there should be no doors at all in bulkheads. Consequently, the man who succeeds in getting a good door that is perfectly water tight, and one perfectly operated, has a valuable invention.

One of these doors has been already installed on the Chicago, and subjected to severe tests, which it has withstood successfully. Should the system ultimately prove worthy of adoption, these appliances will probably be placed in all the naval vessels.

It has always been asserted that the present system of water-tight doors is cumbersome, expensive to operate and not absolutely certain. Some are operated and closed by gear and shafting; others are closed by hand and made fast by grips. It has frequently been found after collision drill and the crews had gone on deck and reported all doors closed that they were very far from being tight, and in the case of doors closed by hand some of the grips were only just caught, while others were screwed up tight.

### A New Building Material.

A NEW building material is proposed by a Boston inventor, one of the prominent advantages of which for building purposes is its fireproof quality. It is described in the *Herald* of that city as a combination of pulverized stone, coal cinders, sawdust or other substances with magnesia and two chemicals which are not made known. It is run into molds when in a semi-liquid state and hardens in twenty-four hours, there being no burning as with clay products, the set being a chemical one. Various substances may be used as the base of the compound. Pulverized marble chips yield a product to all appearances like natural marble, with the crystalline formation and texture of that stone, and when poured on plate glass a good polish is obtained without further treatment and by the use of polished brass molds different shapes may be obtained. For fireproofing blocks and bricks cold cinders ground quite fine, with a small amount of sawdust, are employed. These fireproofing blocks are claimed to be one third lighter than those of terra cotta of the same size, while the cost is reduced to nearly one half that of the latter, and the new material being lighter the space between floor beams may be further and the steel frame of the building lighter, thus reducing the material required very considerably.

### An Oiled Roadbed.

THE Pennsylvania Railroad Company recently sprinkled with crude petroleum a section of its roadbed about a mile long at Morrisville, Pa., and part of a section two miles long just east of Trenton. These portions are ballasted with gravel. When the fast express trains rush by the fine sand is raised in clouds and gets into the passenger coaches. The remainder of the roadbed is stone balasted and on this there is no dust. The oil used is first subjected to a treatment that renders it non-combustible, so that there is no danger of fire from flying sparks.

The oiling is done from a tank and sprinkler on a gondola, which is run at about five miles an hour. The oil gathers the dust and soaks it into a sort of mud, so that it cannot fly in the air. The cost of oiling the roadbed is about \$30 per mile, and three applications are needed each year. The company experimented with the oil on its line between Camden and Atlantic City last Summer, and the results were so satisfactory that the gravel-ballasted portion on the main line will be so treated hereafter.

—Among the latest novelties in cycles is a machine brought out in America, which is a sort of tandem and sociable combined. Two riders sit side by side in front, and two similarly placed behind.

—A motor-bicycle has been brought out in America which consists of an ordinary safety with a small oil-motor attached by clips behind the saddle, and the driving is effected by the frictional contact of the flywheel with the tire of the rear wheel. To throw the motor out of gear it is slightly raised, so that the flywheel no longer touches the tire. The motor is a very powerful one in proportion to its weight. The ignition is automatic except at starting.

—Francis Woodward, of Sugar Grove, Pa., has patented a solder which requires no acid, zinc, rosin or soldering iron, can be heated by a match or candle, and unites gold, silver, tin, copper, and metals of all kinds. The mixture consists of eighty parts each of lead and tin and one and one half parts mercury, combined in liquid condition, thoroughly mixed and allowed to harden.





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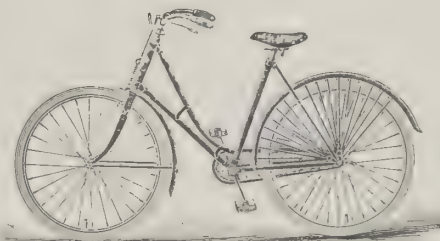
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MADE BY SKILLED MECHANICS.

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Liberal Guarantee.



Two Models, Ladies' and Gents'.

Write for Catalogue.

### THE NORTHAMPTON CYCLE COMPANY,

NORTHAMPTON, MASS., U. S. A.



### A German Letter.

THE following is an extract from a friendly letter to THE AMERICAN EXPORTER from Prof. Geo. S. Atwood, of Berlin: "The German public is at present very susceptible to the intrinsic qualities and downright worth of all American manufactures, from a bicycle to an ice-cream freezer, which latter article is now used extensively by confectioners and even in some private families. All kinds of American machinery sell well. No other nation can make a typewriter to compare with American makes, nor a bicycle so light and so durable and on such elegant lines as the American.

"American carriages ought to sell well, especially in Berlin and Dresden. Several ineffectual attempts have already been made here, resulting in failure, because intrusted solely to German hands. A Berlin carriagemaker cannot, in the nature of the case, be expected to push his rival's goods to the detriment of his own.

"A German-American is the proper man to push American goods, but not a man entirely ignorant of Yankee ways of doing business and who may never have seen the United States. Refrigerators are another article which ought to be put on the market here, as it is only within the last few years German families have come to use them and the German article would make an American manufacturer smile!

"Why is it that the Russian-made rubber shoe has a monopoly here? To be sure the duty on Russian shoes is considerably lower, but Americans, with far better facilities for manufacturing, ought to put a shoe on the German market capable of competing favorably with the Russian article."

### The Pyott Electric Street Car.

IN the United States greater skill has undoubtedly been shown in the construction and designing of street railway cars than anywhere else in the world, with the result that the American car has come to be the accepted model in other countries; and yet there is no time for us to rest and to say, "We have enough." Improvements effecting increased capacity and ease for handling passengers are constantly being made, and the comfort of the passenger is being increased without additional expense to him other than that brought about by the greater temptation to ride when he at other times used to walk.

A novel departure embodying a number of striking features in street car building has recently been made by Mr. Louis T. Pyott, of Philadelphia, to whom a number of patents have been issued both on car body and on truck construction. The dimensions of his car are as follows:

	Fr.	In.
Extreme length of car over bumpers.....	33	0
Body length.....	31	8
Distance between doors.....	14	6
Body width in centre.....	8	0
Body width in ends.....	7	0
Spring base.....	13	0
Wheel base.....	6	6

The car is equipped with the new "Electric, 1,000," motor.

A distinguishing feature is the truck, which has been designated as the "companion," or "sectional truck." Each pair of wheels and axles has its own independent "horseshoe" frame pivoted and connected with the other, thus permitting each pair of wheels to independently follow the rails in any elevation or depression, without any possible twisting of the framework, or the unseating or heating of the journal bearings, or the rubbing of the axle boxes on the pedestals, thereby reducing the running friction and the twisting of the supported car body to a minimum, and the motor and its supports are in perfect alignment with the same.

The auxiliary frame or structure beneath the car is evidently adapted particularly to the varying conditions of the cars to be carried, as shown in the fact that in the car mentioned the length of the spring base is 13 feet.

The beam above affords a point of bearing under which is supported a single equalizing beam in connection with the springs, bearing directly on the oil boxes. There is thus secured what steam railroad men term a three legged support for the car in relation to the rail, avoiding the twisting and rocking of the car body usual in four supports, where some one of the four is usually too high or too low. The equalizing beam allows the wheels to move up and down to any irregular alignment of the rails, and when the springs admit of no more action under an excessive load there is a mechanical action in the lever or beam device itself.

The motor support is at the usual point of a side bar or balance support. An arm spring is in direct connection with the motor casing, dispensing with the usual combination of levers, links and coil springs.

A single-legged pedestal is employed to combine the lower section of the truck and auxiliary frame under the car, thus admitting of the use of a side gap oil box which permits of easy removal of the axles and allows a thorough examination of the condition of the journals to be made in a few minutes. The brake is centre hung and very powerful in its action.

Mr. Pyott has given particular attention to the seating arrangements in the car, which has a seating capacity of 38 persons, with ample room to carry 100 in all. The car is fitted partly with single swivel chairs and partly with double reversible backed benches. These are comfortably upholstered in cane work, and the aisle is so arranged to pass between the wide benches on one side and the single seats on the other.

In this method of building a car the usual platforms are entirely dispensed with. The car has two doors on each side placed about midway between the centre and the end. This lessens the amount of travel required on entering or

leaving the car, and hence effects a saving in time. The diagonal aisle through the central portion of the body brings a direct line of exit to the rear right-hand door, which is immediately under the eye of the conductor. When running on a single track road all four doors can be used. By dropping the lever or cross-bar at the door the step is raised and the use of the door opening dispensed with, thus rendering it safe when running on a double-track road.

The car is intended for universal use the year round, having movable sashes carried in pockets provided in the car, readily removed and stored in the car, in warm or pleasant weather, and readily removed from their storage place and applied to make a closed car if a storm arises, or in cold weather. The motor-man's compartment is arranged to close in rough weather.

From the above description it will be apparent that Mr. Pyott has embodied in his car a number of principles eminently calculated to afford ease and comfort for passengers, and economy for the railway management, as an equipment of these cars answers every purpose of the double equipment of closed and open cars now generally in use.

### A Lens of Great Power.

THERE will be dedicated this month at Chicago, with ceremonies of unusual interest to the scientific world, the celebrated long-looked-for Yerkes telescope. On this occasion Mr. Yerkes will make a formal presentation of the observatory and its magnificent equipment to the University of Chicago. In connection too with the dedicatory exercises a series of conferences on astronomical subjects will be held at the University. The great lens of the telescope has been focused into space, and the light-gathering power of the glass has been proved perfect. It is said to far surpass the 36-inch lens of the Lick Observatory, and Professor Burnham, who is acquainted with all the great telescopes in this country and abroad, has given it as his opinion that the Yerkes lens is the most powerful of all.

Most of the objects connected with the nebula in Lyra, the great cluster in Hercules and the dumbbell nebula have yielded up their secrets in the past only through the agency of the photographic plates. Professor Barnard has seen these only faintly at Mount Hamilton. At Lake Geneva he has been able to view them with unusual distinctness. After Professor Barnard had swept the sky in the region of the nebula he pointed the instrument toward a region located to the astronomer in Pos. 312 degrees; distance 53 minutes. Professor Burnham had frequently pointed the Lick instrument at the same spot with the expectation of finding something new. To Burnham on Mount Hamilton it was all space and nothing more. He watched whole nights and discovered nothing. He swung the giant tube toward the region, and the first discovery at the Yerkes Observatory was registered on the dial near the dome. An unknown wanderer was found near Winnecke's companion to Vega. Although it might claim some distant relationship to Vega's companion it is too far away to be considered as physically connected with the luminary, and may have an orbit of its own. As Vega has been one of the best-observed bodies of the heavenly wanderers the discovery speaks volumes for the new lens. It also disproves the theory of Professor Lowell as to the unfavorable atmospheric conditions of the region in which the telescope is located.

### Palace Cars for President Diaz.

AMONG the many marks of appreciation which the Mexican republic has given to its President, General Porfirio Diaz, the most recent and one of the most valuable is the train of two private cars which has just been completed at Pullman upon the order of the Mexican Government. The cars will be forwarded to the City of Mexico after they are exhibited in the principal cities of this country.

The furnishings of these palaces on wheels are as complete and as costly as those of a city residence of no mean proportions. The kitchen is furnished with every conceivable utensil and convenience from the latest-improved range down to a potatoe knife. The silver plate for service in the dining compartment is heavy and of very chaste design. As in the culinary department, no article of service is omitted nor has there been the slightest neglect shown in the lavish furnishing of bedchamber and drawing-room.

The interior finish of the two cars is made up from many special designs. The bodies are framed with the greatest care. The spaces between the timbers of the bottom frame are filled with mineral wool for deafening. Belgian plate glass is used in the windows. Both cars are liberally supplied with mirrors embossed with the coat-of-arms of Mexico.

Light, heat and water facilities are as complete as in a town house and every convenience has been arranged for the distinguished traveller.

Twenty kinds of wood are used in the two cars, including yellow pine, white pine, whitewood, ash, vermillion, Mexican mahogany, St. Jago mahogany, Prima Vera or white mahogany, American oak, English oak, Pollard oak, black walnut, satinwood, tulip, birch, white holly, boxwood, rosewood, amatant and basswood.

THE waxed top dining table is coming into favor again, it is said. No factory is making very many of them as yet, but it is predicted they will be the rage before long. The rest of the table will be polished, but the top will be simply waxed. The argument for waxing is that a highly polished top makes a table sell, and looks well for a short time after use, but you cannot put hot things or drop water on it without raising a blister or leaving a stain. The waxed top is just like a waxed floor, hard and unaffected by heat and not easily scratched.



**THE BUTTERFLY SEAT**



*Always easy riding and resting. A boon for sensitive and sensible riders.*

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32 CLARK ST., CHICAGO, U.S.A.

## The BUTTERFLY Bicycle Seat.

Conforms by means of adjusting bar to the exact contour of the anatomy of the body. It is practically two natural moulds upon which the human form can rest. These moulds are responsive to every motion of the limb. A boon to both sexes

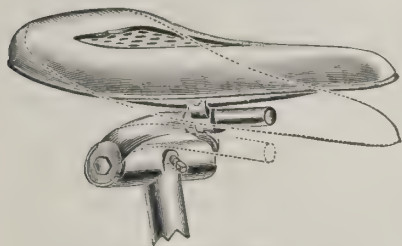
**Price, \$4.00.**

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## Goodenough Spring Seat Post.



Dotted Lines Showing Action of Saddle.

The spring, being horizontal, has a different action from any other seat spring. It takes up the action of the wheel and relieves the rider from shock and recoil. It can be adjusted to any wheel, and any saddle can be used with it. It gives to the saddle a leverage motion instead of a direct motion, the saddle being attached by a lever to the outer ends of the spring, the center of which is held stationary by an adjusting screw. It does not change distance between saddle and pedals, the rear of saddle remaining practically stationary. It admits of adjustment of tension, to suit the different weight of riders (see cut).

Send for Catalogue "R."

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## If you wish to ride with comfort,

discard your present saddle and ride

### The Wheeler Reform Saddle.

This means comfort and freedom from saddle soreness. Physicians recommend it. Especially liked by ladies. If your dealer neglects to keep it, write

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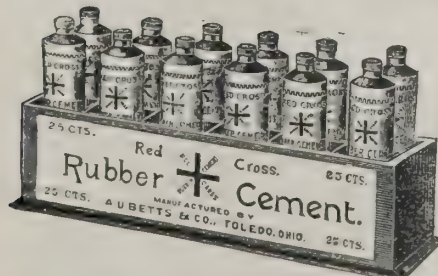
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Spring Easy and Unbreakable

Made in two sizes,

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**Comfort.**

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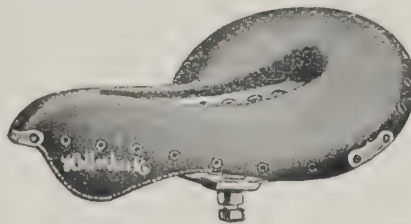
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Ease and Durability Combined.



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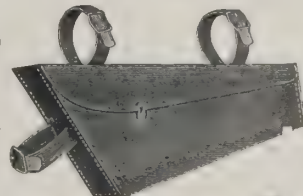
U. S. A.

Illustrated Catalogue D on application.

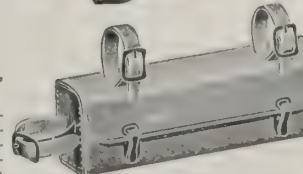
Correspondence solicited. Orders filled through commission houses.



No. 10.  
Tool Bag.



No. 20. Tool Bag.



No. 30. Tool Bag.



### Electric Sounding.

AN apparatus known as the electric sounder has been invented by John P. Buckley, by means of which captains may be able to ascertain the depth of water for 2,000 feet ahead of their vessels. The inventor expects that it will supersede the lead and line. Mr. Buckley is confident that his apparatus will do away with the present tedious manner of making soundings, and that vessels will no longer have to feel their way into port when the air is foggy. With his invention the sounding is done by means of a bell circuit, which passes through a carrier, and thence to a non-conducting cylinder filled with quicksilver. When the cylinder strikes bottom a circuit is completed, which rings a bell on board the vessel and gives warning that the vessel is in dangerously shallow water.

The apparatus, to speak more in detail, consists of an air gun, about 2,000 feet of wire, or, rather, of two wires bound around each other, a hollow shell, which will float a cylinder of quicksilver, and an electric battery. The air is forced into the chamber of the air gun by turning a wheel. The cylinder with the wire attached is loaded into the gun. The wire is placed upon a reel, and as much is wound off as the force of the projectile will take with it. The cylinder is hurled through the air for anywhere from 5 to 2,000 feet. The distance depends upon the number of turns the operator has given the wheel by which the air gun is loaded. The cylinder strikes the water and sinks. The length of wire which intervenes between the cylinder and the hollow floating shell, or carrier, represents the depth of water in which it would be safe for the vessel to venture.

Most large ocean steamers draw 30 feet. When the wires enter the cylinder they are separated. They run into the cylinder separately and terminate within only a short distance of the surface of the quicksilver. If the water is deep enough the cylinder will simply hang to the end of the line. If the water is too shallow, however, the cylinder will tumble over on the bottom, for the end of it is rounded. The mercury which the cylinder contains will then rush about the ends of the wires, complete a metallic current and cause the ringing of a bell on board ship, with which the wires are connected. The efficacy of this invention depends upon the certainty with which the cylinder will fall over when it strikes the bottom of the channel. Mr. Buckley has been experimenting with the device for twelve years, and he is confident it will accomplish all he claims for it. "The weight of the cylinder and its contents," he said, "to say nothing of the action of the waves, will cause it to fall over at once. Besides that the end of it is rounded like the bottom of a ginger ale bottle. I tried a model of this device in Lake Pontchartrain. In all the experiments it worked perfectly."

As soon as the cylinder sinks the man in charge of the apparatus proceeds to draw in the line. If he hears no warning bell he may be sure that the course is entirely clear. The vessel may then proceed for the distance to which the line has been cast. If 2,000 feet have been sent out the mariner may know that his course is clear for that distance. He may then proceed. When the vessel has gone half the course he may discharge another cylinder. When he has reached the end of the course which the first cylinder has told him was safe he will have determined the nature of the channel for the next 2,000 feet.

### Sextuplex Telegraphy a Fact.

THOMAS BULLITT DIXON is a young and very clever man. He has succeeded in accomplishing a feat in electrical science that has baffled even the Llewellyn Wizard Edison, who sold his quadruplex system of telegraphy to the Western Union Telegraph Company twenty-three years ago for \$30,000, and spent the whole of this amount in unsuccessful experiments for making a wire carry six messages instead of four. Young Dixon took up the idea abandoned by Edison for more pressing work and carried it through to perfection.

To the world at large Mr. Dixon's is a new name in electrical work. He was educated in New York and Berlin, but took up electrical studies as the result of a natural bent without the aid of any technical college or master. His first achievement was a system of electrical block signalling which reduces the problem of railroad signalling to its primary elements, i. e., the human brain and the pocket watch. This system registers trains accurately at a speed of 125 miles per hour, and is never thrown out of repair.

He has now not only brought the quadruplex system itself to a pitch of perfection hitherto unknown, but he has placed before the scientific world a sextuplex system which works with admirable precision. Experiments made last week in Boston have triumphantly established this important fact.

Its importance can be easily estimated even by the non-scientific mind. It makes one wire do the work which under the original Morse system would have been done by six. Joseph Stearns by his invention of the duplex telegraph made one wire do the work of two. Edison by the quadruplex system made one wire do the work of four. And now comes Mr. Dixon to increase the potential work of every wire so as still further to minimize the expense of putting up and keeping in repair the telegraphic systems of the world. The actual money saved will in the near future count up into the millions if Mr. Dixon's invention justifies the promise of these first experiments.

It is no easy matter to explain to the lay reader how two or more messages can be sent simultaneously on the same wire without mutual interference. But facts, at least, can be set down in plain language.

To go back to the initial stage of telegraphing, under the original Morse system, a single wire could be used only by one operator in the transmission of one message. Station A, for example, could forward a message to Station B,

and Station B could similarly forward a message to Station A. But each must wait until the wires were free. With the rapid increase in the business of telegraphy, however, the ingenuity of inventors was set to work at the problem of increasing the capacity of a single wire for the transmission of messages. The first efforts were naturally directed toward the comparatively simple problem of doubling the capacity by allowing of the simultaneous transmission of two messages, one in each direction, over the same wire. So early as 1853 solutions of this problem were attempted in Germany, but the first to introduce a really practical system of what has since been known as duplex telegraphy was Joseph Stearns, of Boston. By this system a sending operator at A could forward a message to a receiving operator at B at the very moment that a sending operator at B was forwarding a message to a receiving operator at A. Stripped of all technical verbiage, and dealing only with objective facts and not subjective reasons, the duplex system provided that the receiving instrument at A should not be acted on by the currents sent into the line at A, and similarly, that the currents sent into the line at B should not act on the receiving instrument at B, while at the same time these currents should act on the instruments at B and A respectively.

This result being achieved by duplex telegraphy, the next problem which presented itself to the inventor was to send two messages from each station simultaneously with the reception of two messages from each, or, in other words, to enable a single wire to carry four messages at one and the same time. This is what is known as the quadruplex system. To Thomas Edison belongs the glory of having achieved the first successful operation of this system. Under favorable circumstances his invention is capable of transmitting four messages simultaneously. But circumstances are not always favorable, and, in point of fact, it often happens that under certain conditions of weather, etc., three messages are the utmost that can be transmitted simultaneously on a single wire.

As already noted, Edison, after being repeatedly baffled, abandoned his experiments at this point. It only remained that a new genius should arrive to perfect Edison's system and introduce a further improvement in the way of a sextuplex which should triple the possibilities of the duplex as Edison had aimed to double them. Such a genius is Mr. Dixon. He has not simply invented a new quadruplex which works perfectly under all conditions, but he has supplemented this with a sextuplex which will enable six messages to be sent simultaneously over a single wire for a distance of at least 300 miles.

To confine ourselves for the moment to Mr. Dixon's quadruplex, he confidently believes that its use may be extended to the Atlantic cable, with an incalculable minimizing of the expense and difficulty of transcontinental intercommunication.

"The principle involved in my devices," Mr. Dixon said to me, "is such as to render possible the operation of long submarine cable circuits on the quadruplex system, whereas at present it is only feasible to operate them as duplex circuits. It will, therefore, be possible to send four messages simultaneously across the ocean to England."

Mr. William Finn, of New York, the electrician of the Western Union Telegraph Company, supplements Mr. Dixon's statements. He describes that gentleman's inventions as being the application of entirely new principles which heretofore have never been tried in telegraphy.

"They involve," he says, "the use of but one single voltage for operation of both the receiving and the sending instruments, one being actuated by a continuous current and the other by a pulsatory current, the current used being very much smaller than that in use for the present quadruplex system. The fact that a comparatively low voltage can be used to operate the quadruplex system is of considerable practical importance, for the reason that it admits of the system being operated to much better advantage in bad weather, when it is really needed, and also because the smaller battery power produces less interference with the operation of neighboring circuits."

### A New Gas Stove.

A PHILADELPHIA inventor is testing an improvement in gas stoves and ranges. The change is in heating two or more vessels by one burner instead of having a flame under each kettle or frying pan. One vessel only is exposed to the direct action of the flame; the two others are heated by water circulating through tubes connecting them with the spider over the burner, and thus, it is stated, three times the amount of cooking is done with a single flame. Pipes connect a water tank and the two kettles with the hollow chamber of the spider; a kettle or frying pan is placed over the burner and the gas heats the water, which cooks vegetables, etc., simultaneously with whatever is in the vessel heated by the flame. The advantages of the double boiler are well known, and the inventor's claim is that with his arrangement two boilers are kept running without the use of additional gas, one burner furnishing heat for three cooking vessels. The apparatus was exhibited at the State Fair. It is applicable to any gas or gasoline stove.

MR. ALFRED I. HART, of Baltimore, sails by the S.S. Belgic from San Francisco on the 30th of this month for China and Japan. He contemplates spending the ensuing two years in studying the requirements of the Oriental countries and the prospects of American importations in specific lines. Mr. Hart has had much experience in the foreign trade, and but recently returned from South Africa, where for twelve years he had sole charge of the American Tobacco Company's trade. During his stay in China and Japan he will be the correspondent of THE AMERICAN EXPORTER.





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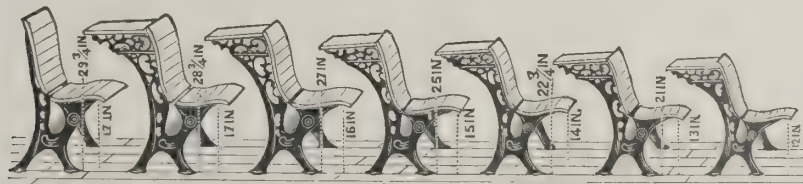
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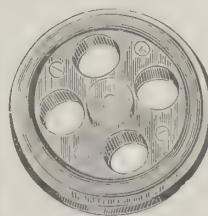
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Dear Sir:—We have used your colors for the last two years and we like them better than any we have ever used. Your Black, Wine and Greens are very fine colors, being very finely ground and having a good strong body. Your Ruby Red, we think, is the finest Red in the market, and full as nice as Carmine.

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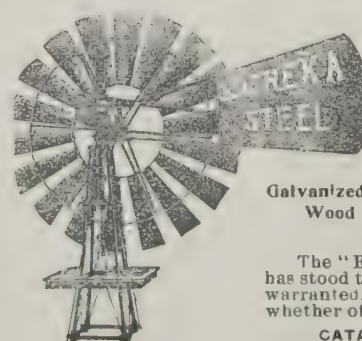


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CATALOGUE AND PRICES ON APPLICATION.



### A Railroad Ticket Register.

THE railroad companies in America have for a long time been searching for a ticket register that would be economical, accurate and practical. A most ingenious machine for this purpose has just been invented which manufactures, prints and cuts the tickets automatically one side, while on the other it registers the number of the ticket, its destination and the price. A simple addition of the numbers lined on this band gives the total of the amounts which the receiver has registered during the day.

Every one knows that the tickets delivered to the station masters here are of different colors according to their class and their destination and whether they are full fare, half rate or excursion. All the tickets are most carefully manufactured, as they represent important sums of money. From the manufacturer they are delivered to the main office, and from there distributed over the whole territory covered by the railroad company. It can easily be seen that the slightest mistake in their manufacture would cause endless confusion. As each station is the object of a special fabrication, for the name, the number and the point of departure are always printed upon it, it may be realized that an immense number of pieces of cardboard are prepared.

The manufacture and the registering of such an enormous stock of small pieces of cardboard are so complicated that the companies really do not know just where they stand all the time. Mistakes and frauds are daily committed, notwithstanding all the precautions taken. The machine has been invented with the idea of preventing any mistakes or fraud, and of correctly registering every day the exact number of tickets sold and the amounts received for them.

The apparatus is quadrangular in form. At the bottom of the box is a small electric motor which sets a nickel-plated wheel in motion, this wheel being placed on a level with the handle on the left side of the apparatus. The long cardboard bands are rolled around three or as many wheels as are needed, situated above the motor and below the composing cylinder. It is this cylinder and its wheels and its teeth, located in the upper part of the machine, which constitute the functional secret of the latter. In conjunction with the large exterior wheel, which revolves against the outside wall on the right of the apparatus, the mechanism works secretly in the interior. On this large wheel are inscribed the names of the different stations and the prices of the various trips.

When a ticket is desired for a given point the large wheel is set revolving until the name of the station asked for comes opposite a small iron point. One of the buttons corresponding to the three openings is then pressed, and this sets the interior machinery in motion, and in less time than by the old-fashioned way of stamping, the ticket comes out ready to be used. If more than one ticket for the same place is desired, the button is pressed as many times as there are tickets needed.

While the machine is delivering the tickets the same are being mysteriously registered in the interior of the apparatus. An endless band unrolls from the top of the apparatus and registers simultaneously with the delivery of the ticket its number, its series, its destination and price.

### Safety Device for Railroads.

A CONTRIVANCE for the saving of life by preventing railroad accidents through forgetfulness of trainmen has been invented. The machine has just stood a severe test on the Great Northern Railroad, after having been previously operated successfully on the St. Paul and Duluth road. Practical railroad men have given strong indorsements to the device after seeing its work. The object of the device is to provide an accurate and reliable reminder signal and distance indicator for locomotives, by means of which engineers are prevented from forgetting their train orders as to stopping or meeting points.

The mechanism is simply but positively connected with the forward trucks of the engine, thereby accurately measuring the distance travelled, the dial placed in front of the engineer showing correctly this distance. Above the dial are placed 15 triggers or dogs, pivoted at equal distances around the centre. When the engineer receives his orders he sets one or more of these triggers to a point one mile short of the distance to be travelled before reaching the stopping place. The mileage indicator on reaching such point releases the trigger which starts a signal whistle blowing. This continues to blow for one-quarter of a mile, promptly warning the engineer of the near approach to stopping place. If the engineer is inattentive and fails to stop when this last mile has been run over the machine sets the air-brake and stops the train for him. A train similarly equipped, coming in the opposite direction would be stopped in the same manner, and a collision prevented. The device can be made to run forward or backward. For foggy or storming weather, or for dark nights, the device is considered especially valuable for ordinary road use, although its life-saving feature was the point at first sought for.

### Aluminum Wire.

ALUMINUM wire is made of various sizes and used for a variety of purposes. Among its newer uses is the manufacture of door and window screens. When exposed to the weather such screens do not rust. Aluminum wire is used in the manufacture of hairpins. In a few cases in this city aluminum wire has been sold to be put up on roofs for use as clothes lines. The wire sold for this purpose was No. 6 gauge, which costs 60 cents a pound, and 1,000 feet of which weighs twenty-four pounds.

Aluminum pigs sell now at about 42 cents a pound, which is about half the price of a year ago. The sale of manufactured articles of aluminum is all the time increasing and things in great variety are made from it.

### American Competition.

WE have to thank our friend and contemporary, the *London Ironmonger*, for the following complimentary and honest expressions concerning American competition in certain trades:

"One of the latest instances of American competition is given by a correspondent of the *Times*, who signs himself 'A Director of a Foreign Railway.' He says he has had occasion recently to open tenders for the supply of steel girders for bridge work. The American offer was for 3,858*l.*, free on board at an American port, while the lowest English tender was for a sum of 4,483*l.*, free on board at an English port, the difference in favor of the American tender being about 15 per cent. He concludes by remarking: 'Comment is scarcely necessary; but I am aware that a similar position exists with reference to other classes of railway material. Lockouts and strikes at present seem scarcely opportune in the interests of English trade.'

"The English hoop manufacturers, who have for some time past reported an almost complete loss of the export trade with America in what are known as cotton-tie hoops, are now experiencing a keen American competition for their export trade with South America, and during the last few weeks American manufacturers have taken one or two lines of at least 2,000 tons, which in the ordinary course would have come into the hands of British manufacturers. No definite figures are obtainable as to the prices at which the Americans have secured these orders, but they are stated to be considerably under the lowest quotations of English manufacturers.

"Some time ago I alluded to the great development of American competition in various lines of iron and steel, and among other things I mentioned cast-iron pipes. I was well aware when I made this allusion of what was being done, and I am now equally well informed when I say that offers have been made to supply firms in London with pipes of this class, for use in England or in certain of our Colonies, at \$15, or equal to about 3*l.* per ton, f. o. b., at specified United States ports. If this price is one which can be actually quoted, I think it is pretty clear that our own pipe founders cannot touch it. I am assured on most reliable authority that the price I name is one at which orders would be booked and at which sales are being made in the United States."

### An American Idea for Paris Exposition.

A COMPLIMENT has been paid to American ideas by the management of the forthcoming Paris Exposition. One of the most difficult problems connected with the great fair—that of rapid and easy transit within the grounds—has been finally decided in favor of a system of traction known as the moving sidewalk, which was tested and successfully introduced at the World's Fair at Chicago.

All who visited that stupendous exhibition will remember the ingenious contrivance, consisting of a row of seats resting upon an elevated wooden pavement which slid upon rollers propelled by electricity. The mechanism consisted in reality of two parallel surfaces moving in the same direction, the one nearer the station platform going at a lower rate of speed, so as to allow the passenger to make the transit to the more rapid surface without danger or shock. The system worked very well, and it was introduced at the Berlin exhibition some time after, under the supervision of the American inventors, Messrs. Silsbee & Schmidt.

A writer for a local magazine writes a description of the moving sidewalk to be used at the Paris exhibition in 1900:

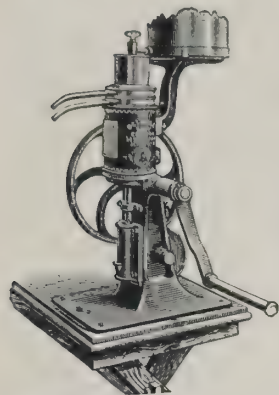
The "moving sidewalk" of the Paris Exposition of 1900 will resemble its predecessors in its general plan, but it will also embrace several important improvements. One of the principal objections to the original invention was the fact that not only the planes, but also pretty well all the other portions of the contrivance—wheels, motors, axles, etc., etc.—were included in the general movement. This necessitated a stoppage of the entire mechanism every time repairs became necessary, occasioning a grievous interference with the traffic. Furthermore, the disposition of the rails and other defects in the construction resulted in considerable friction and wear and tear, calculated to render the operating of the road a serious menace to life and limb. Without going into technical details, it may be said that the French engineers, Messrs. Armengaud, Blot, Guyenet and Mocomble, have succeeded in eliminating all the objectionable features of the old system and producing a method of traction that commends itself to the exposition commission as fulfilling all the requirements of the situation. This road, forming a belt around the grounds, will be able to convey 51,732 passengers per hour—a record impossible to equal by any other method. It will prove a veritable godsend if, as the commissioner-general, Monsieur Picard, calculates, the attendance at the exposition should exceed 60,000,000.

The general appearance of the "moving sidewalk" will resemble the New York elevated railroad, being supported by steel uprights about 15 feet in height, with stations at regular intervals reached by pairs of staircases. The plan is to include within the belt the entire Champs de Mars and the Quay d'Orsay so far as the Esplanade des Invalids, so that every passenger, for his 10-cent fare, will obtain a full panorama of the best part of the exposition.

—As an illustration of the benefits of invention, take the common nail. In 1818, when they began to be made by a machine operated by hand in Pennsylvania, they cost from 18 to 37½ cents per pound, according to size. Now they are sold at 1 to 1½ cents per pound—so cheaply, indeed, that a carpenter, working for 30 cents per hour, had better let a nail go than to spend ten seconds to pick it up, for ten seconds of his time is worth more than the nail.



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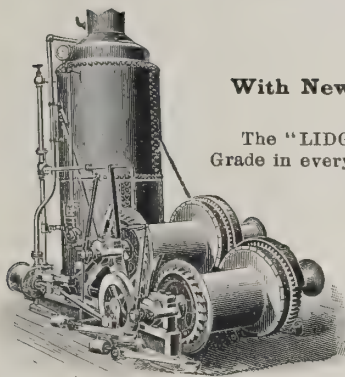
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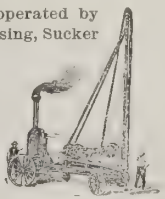
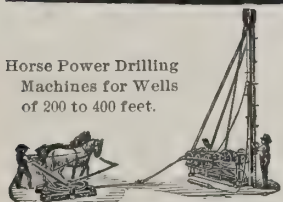
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The Catalogue, which we gladly mail upon request, will give you an idea of the extent of our line of Lamps and Lanterns with prices and discounts.

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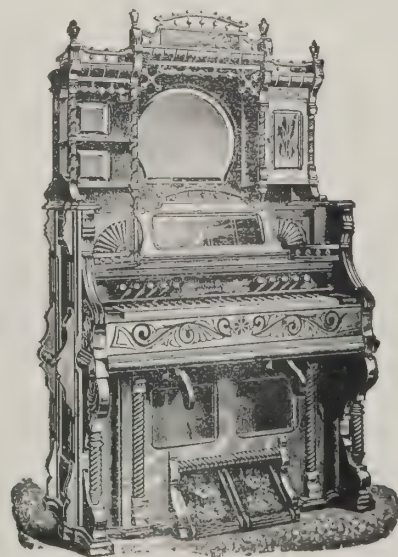
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### An Artificial Moon.

COLUMBIA UNIVERSITY of New York has adopted for its new library a scheme of illumination as original as it is beautiful. By a system of reflected lights a big white moon, whose luminous rays will light the whole interior, hangs suspended from the dark blue background of the dome.

Although electricity alone is used, and the most intense rays from arc lights are focused through strong lenses on the great white sphere, the reflected radiance of the moon consists of rays so soft and diffused that it is refreshing to the sight. The students, in consulting volumes in the library, while receiving the benefit of the light above them, will be in no wise inconvenienced by it.

The moon consists of a hollow sphere, seven feet in diameter, constructed of wood and painted a dull white. It is suspended thirty feet from the dome by a wire cable and hangs just above the four great arches of the library, so that when the light is thrown on it the arches are in shadow.

On the second floor of the library, in the recess below every one of the four great windows, is stationed a row of bookshelves. In the corners of every row stands an unobtrusive box of finished oak, about five feet high. There is no covering to these boxes, and in the depth of each burns a powerful arc light, whose rays are directed through a lens toward the wooden ball.

The strong electric lights, so painful to the eyes, are entirely hidden. As one walks about the library floor and looks up at the eight boxes in their respective corners, they seem to be but portions of the woodwork. Even on the floor above, groping among the books on the shelves, the entire unsightly electrical mechanism is hidden from view.

Every one of the eight rays is about seventy-five feet long, and their combined radiance covers about three fourths of the ball. The wooden sphere is intensely illuminated and diffuses a light which is similar to moonbeams.

Mr. George Baker, the librarian, gives credit to Mr. Charles McKim, the architect, for the idea. "It took a lot of study to evolve a system of illumination that would be in harmony with the handsome decorations of the library," said Mr. Baker. "A great chandelier suspended from the dome would have been decidedly inappropriate. Had lights been stationed here and there over the arches they would have confused the eye. It was necessary to devise an illumination that would disclose the dome and lend a cheerful air to the library."

Mr. Baker expressed himself as delighted with the artificial moon. He said that the readers at the tables would be supplied with the ordinary shaded lights.

The idea of the artificial moon was put to the test some weeks ago in the old library of the university, and proved itself a great success, although rays from only about three arc lights were thrown on the sphere.

The experiment was made under the direction of William Hallock, professor of physics, and Charles McKim, the architect. Although the idea of a globe suspended from the centre of the dome was embodied in the inception of the architect's plans, it was originally intended to construct a metal sphere to represent the globe and surround it with a circle of incandescent lights.

### American Tools.

THAT "American" has become a standard for tools, both great and small, is a fact hardly disputed even by our strongest competitors. The New York representative of an American tool manufacturing establishment, when asked where American tools were sent, ran over the export orders received that day. They included orders from Hungary, Austria, Germany, France, England, South Africa and South America. There were altogether about twenty orders, and from some of the countries named there were two or three orders. The export orders of the previous day included orders from Russia, Australia and New Zealand, and these were not unusual orders, but such as are constantly received. In the shipping room at that moment stood cases marked for Java, for Ecuador and for Australia.

Many of these orders are small. In some cases there were orders for a single tool, or for two or three; for some, orders of half a dozen, or two or three dozen, to supply orders or to keep lines filled. These small orders are mostly from European countries, with which communication is nowadays quick and convenient. European merchants order these things just about as merchants in other cities in this country would. It costs no more to send to London than it does to Chicago, and it is as easy to send to Berlin as it is to Paterson.

The characteristics that commend these American tools to their foreign purchasers are the same that mark American machines and implements generally; lightness, fine finish and perfect adaptability to their several uses.

—The following railroad statistics for the United States are taken from official figures. At the close of 1896 there were 1,687 miles of track laid, which raised the total mileage to 182,600 miles, less than 5,000 miles of which were out of operation. The year's earnings amounted to \$1,125,500,000, and of this sum \$770,000,000 represents freight traffic.

—It is now conceded that the aerial torpedo is a practical possibility says the *Chicago Journal of Commerce*, "though perhaps like the successful airship, there may be prolonged incubation before the expected fowl emerges from its shell. Taking the cost of a first class battleship as approximating \$5,000,000, it is not a very consoling reflection that at a minimum of cost, the coming torpedo craft could send it to the bottom of the sea without respect of crew or cost. Such possibilities are among the terrors of nations, as are plunging headlong in one special type of warship. The science of destruction is progressing at so fast a rate and the range and venom of explosions so increasingly deadly, that any abuse of public moneys in uncertain methods of warfare, if not a crime, is pretty near being a folly."

### Boots and Shoes for France and Germany.

RECENT advices from France and Germany are very encouraging to American manufacturers of the better grades of boots and shoes. According to a prominent Boston manufacturer who has lately sent a traveller to France, the American made shoe is growing more and more in popular favor each year. This season a greater number of shoes will be sent abroad than ever. In the markets above mentioned, it is said, they care only for the better grades of shoes, and the retail prices range from \$5 to \$10 per pair, according to quality, workmanship and style. It is also stated that the American machinery for making shoes is considered superior to any made in Europe, and that some of the leading French wholesale shops have adopted a number of new American devices in order to keep abreast of the times. The French shoemakers, fearing American competition may affect their trade, are imitating those styles that are being imported from this country, and which meet with popular demand. For this reason, the same party says, as soon as a new style appears in the market the wholesale dealers buy the samples, and if the particular style takes they will imitate it. Prices seem to be the only advantage in favor of the home manufacture. They cannot, however, quite come up to the American made shoes in either durability or material.

From Germany, according to the partner of a Brooklyn shoe manufacturing firm, the demand is increasing, and the orders are much larger this season than last. A great deal of business has been transacted throughout Germany by catalogue, but at present those manufacturers wishing to make permanent connections are sending travellers over with samples best suited for that market. In his last report to the State Department at Washington Consul-General Mason, at Frankfort, Germany, writes in regard to the shoe and leather trade, in part, as follows: "American shoes, notwithstanding all doubts and a certain timidity on the part of American exporters, are steadily finding their way to Germany, generally by way of London or Paris, and meeting with a ready sale. There are now two stores in Frankfort and three at Wiesbaden where American-made shoes are kept, but as yet in small assortments and limited quantities. The same situation is reported from Berlin, Hamburg, Dresden and other leading German cities. From all that appears, the prices charged are inordinately high in comparison with the retail values of similar shoes in America, and the grades offered are not above medium or common. In every important German city or large town there could be established with practical certainty of success an American shoe store which should sell at wholesale and retail."

### A New Level.

A NEW pocket level has been invented which, without doubt, is one of the most useful and ingenious little instruments brought out in recent years. Every one who has any levelling to do knows what tedious work it is to level anything up on both sides, or rather both ways, since with the ordinary level one can only see one way, and consequently it must be turned around and tried until the work is found to be true. It is often found that when the work seems to be perfectly true one way, by trying in the other direction, where it has previously been trued up is out again. This little tool when put on the work will tell in an instant just which way it is out. The inventor has named it very appropriately "Which Way." It is circular in form and the bubble is in the centre when the work is perfectly true, and if high in any direction, the bubble will, of course, travel that way, showing exactly where to remedy or rather raise or lower the work.

It consists of an accurately concave ground lens screwed to a turned steel base containing the spirits, with turned steel cap, the whole being nicely nickel plated and polished. It is the size of a dollar and very convenient for pocket use.

—Up in Maine, where they have good waterfalls to furnish the power, electrical transmission of power is becoming quite popular. A Bangor paper says the Bath Iron Works are to do away entirely with steam for power to run their machinery in all the departments, and during the next month the necessary motors will be placed in position to furnish sufficient electricity to perform the work. At present there are six motors in operation. It will require five more to run everything by electricity.

—The Reading Railroad Company is about to change the system of work in its coal fields, which will effect a large saving a year. Air compressors are to take the place of mules. At present several thousand mules are at work under ground in their forty collieries. These mules haul small cars of coal from the various mining chambers to the mouth of the shaft to be hoisted up to the breaker. The experiment with compressed air motors has been tried at the Alaska colliery. Within six months compressed air motors will be put into all the collieries, and the mules will have to go. From 60 to 150 mules are used in each mine. They come from Kentucky principally, and are never hoisted from the mines unless a flood makes it necessary.

—Few inventions have been more surprising than that of a machine glass-blower, now being perfected for a firm in Muncie. Glassblowers have always been regarded in a peculiar sense as skilled workmen. Their work has been regarded as difficult and delicate, and they have commanded exceptionally high wages. Now all this is to be changed by a machine, which, it is said, will do the work as well or better than the human blower, while one machine will do the work of three blowers at less than half the cost. Such an invention cannot fail to have an important effect on the glass industry. Its first effect will probably be to throw out of employment a considerable number of skilled workmen, but the industry will soon adjust itself to the change, and eventually all classes will be benefited.



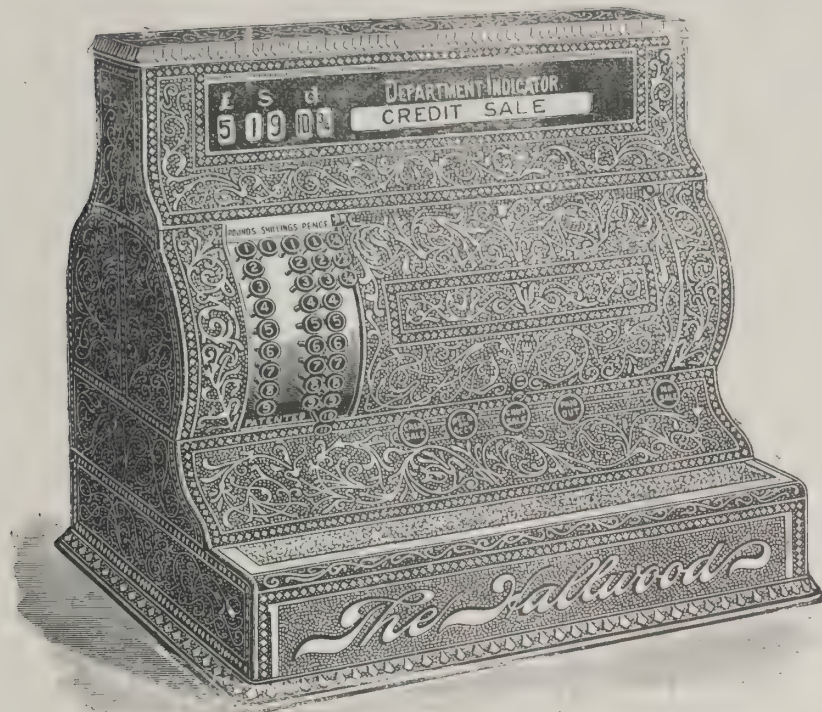
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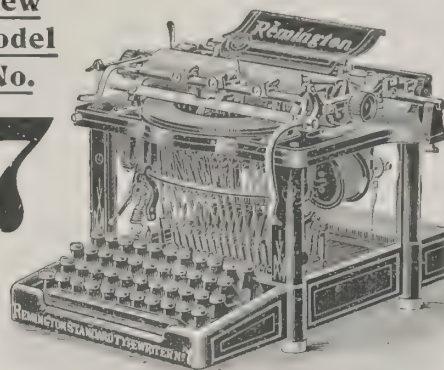
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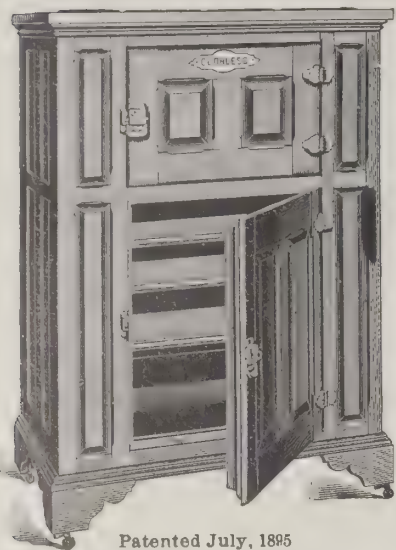
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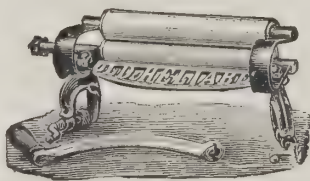
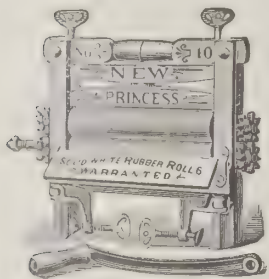
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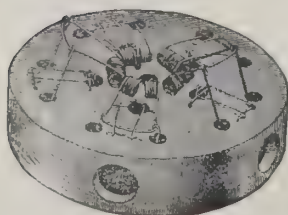
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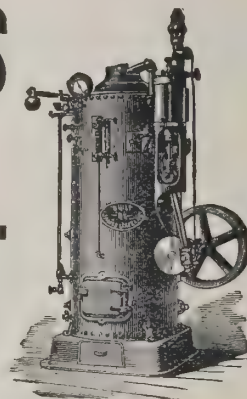
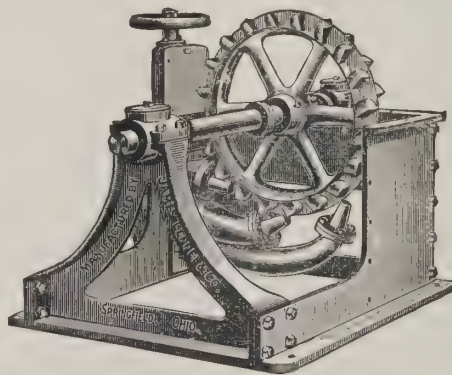
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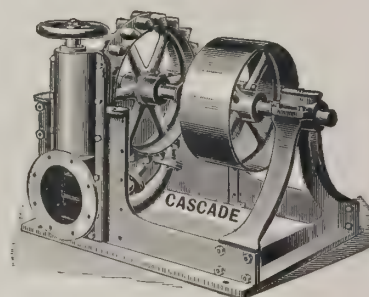
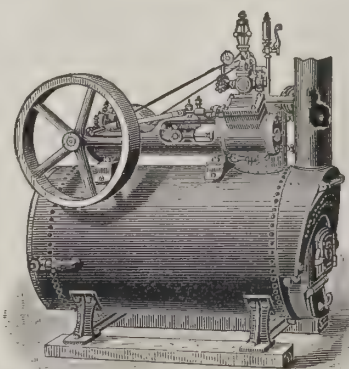
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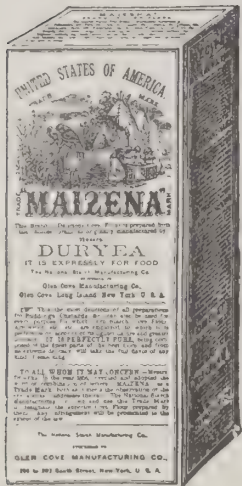
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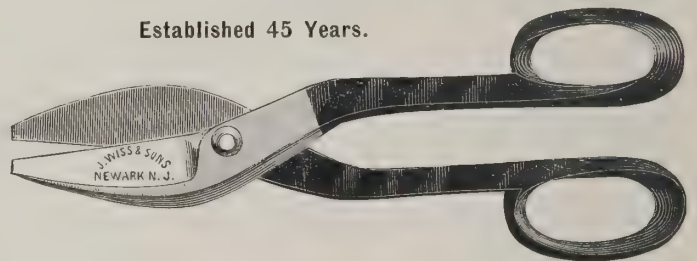
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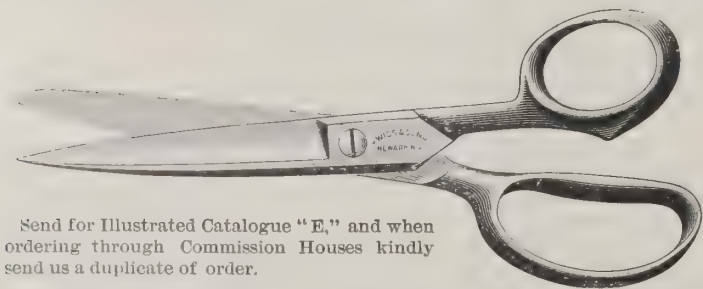
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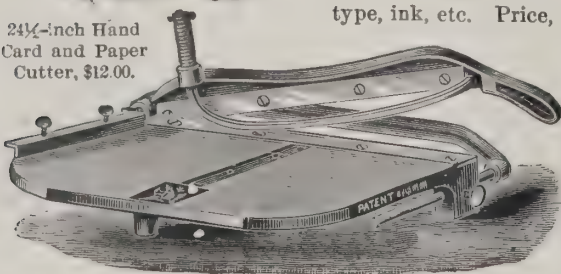
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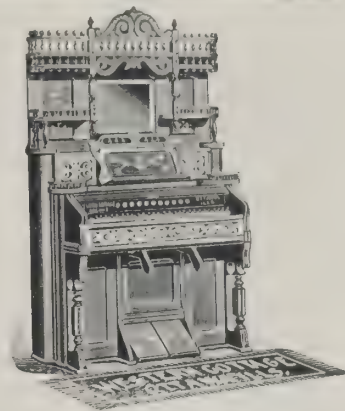


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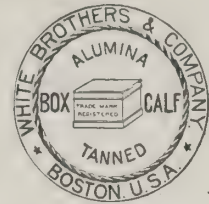
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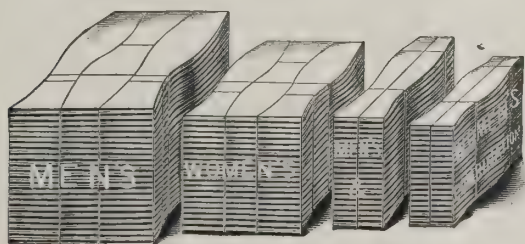
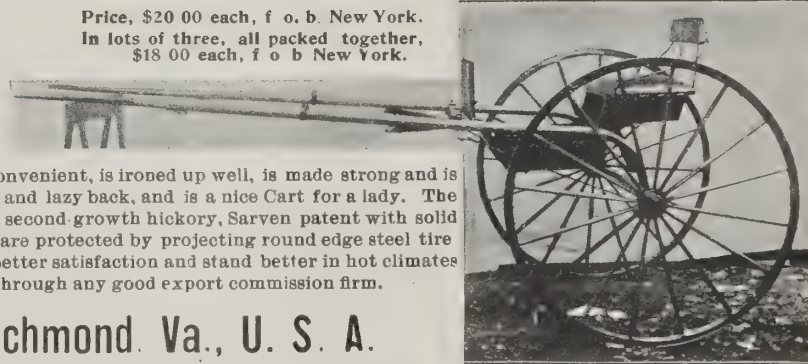
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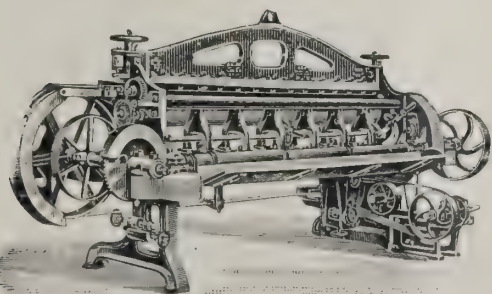
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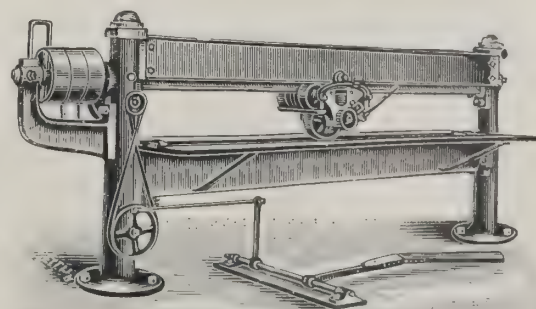
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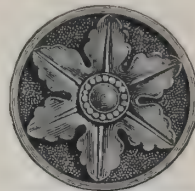


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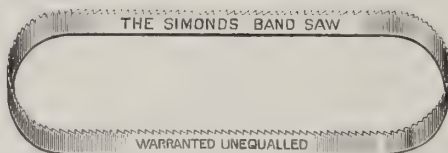
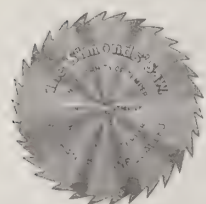


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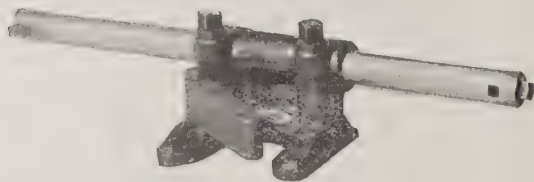
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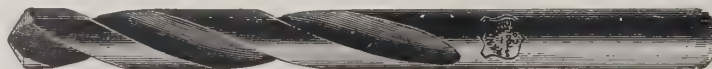
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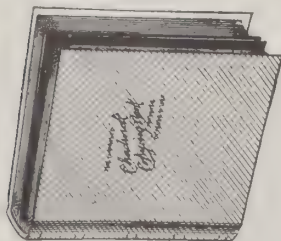
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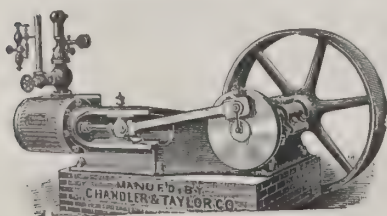
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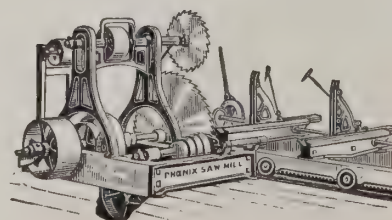
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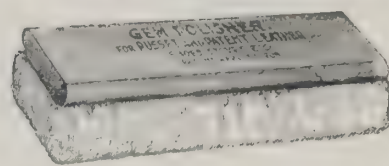




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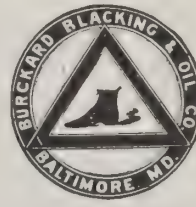
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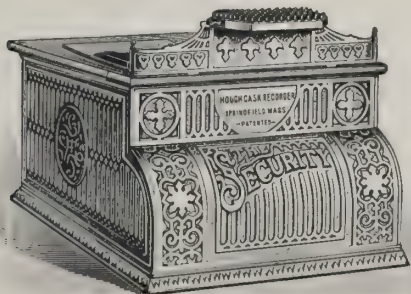
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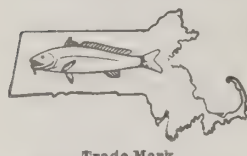
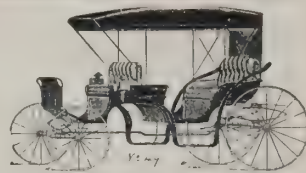
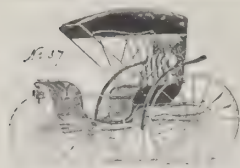
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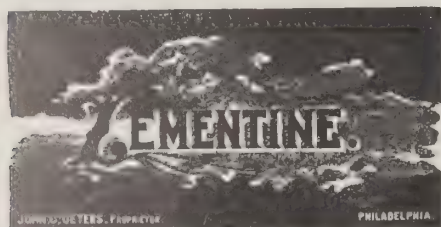
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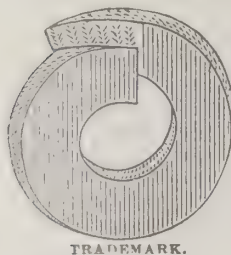
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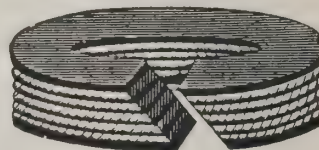
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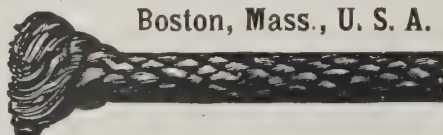
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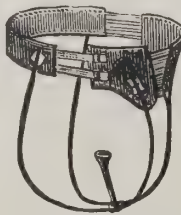
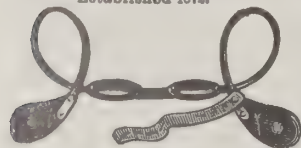
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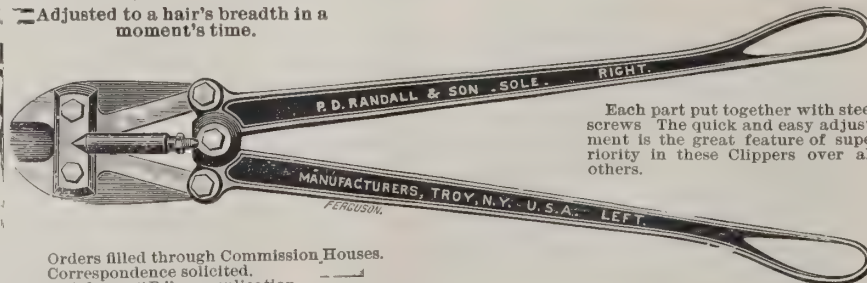
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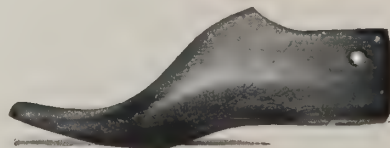
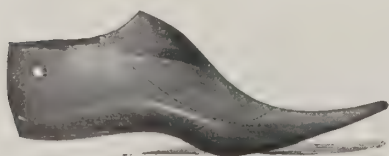
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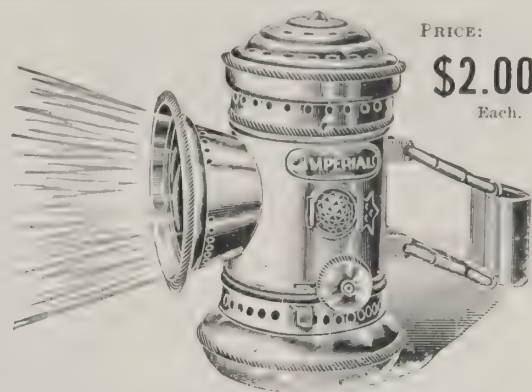
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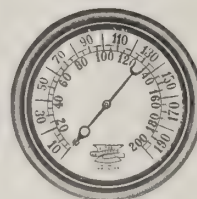
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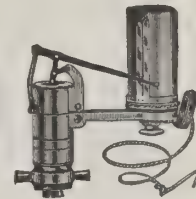
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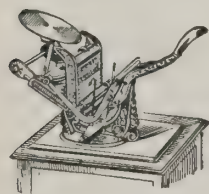
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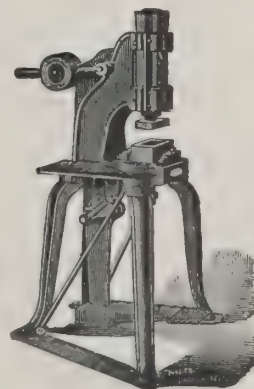
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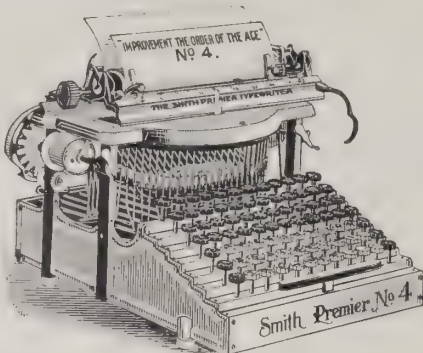


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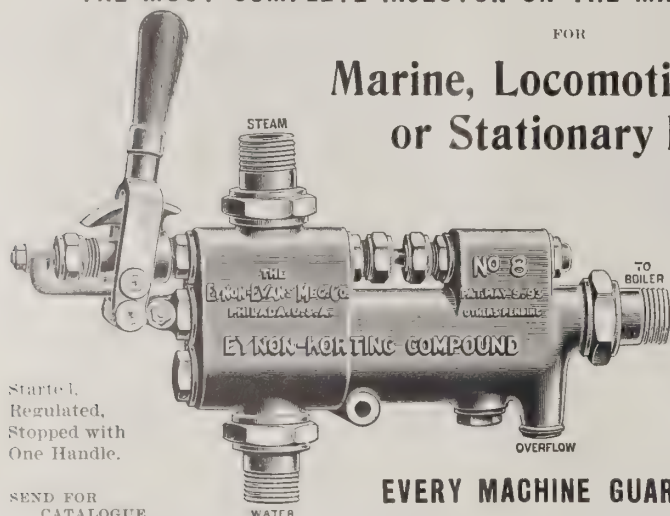
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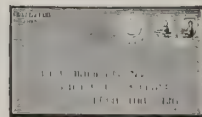
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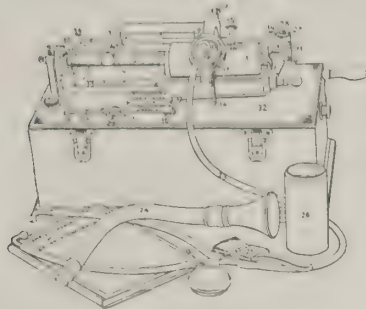
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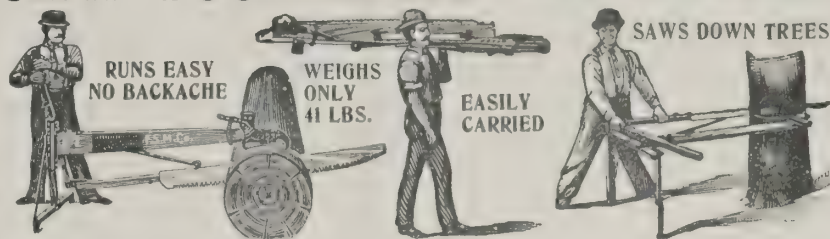
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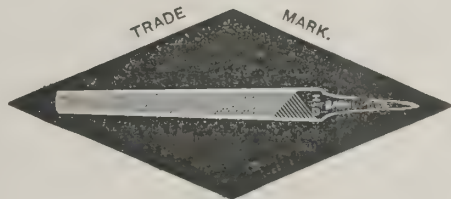
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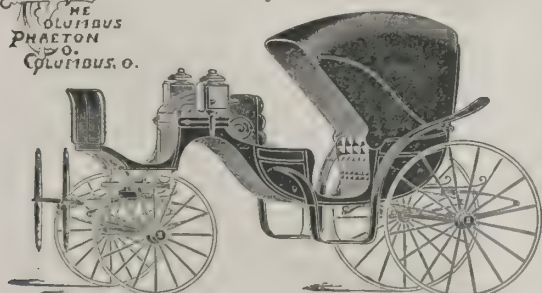
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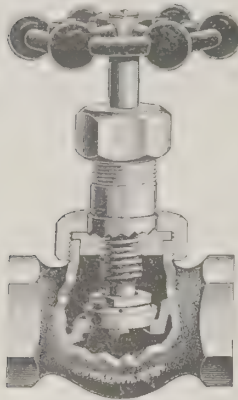
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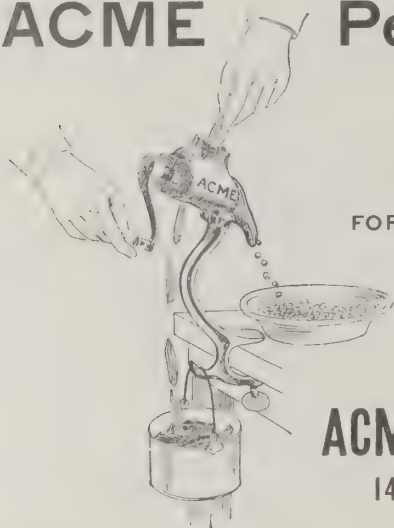
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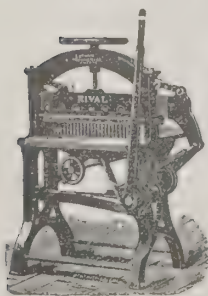
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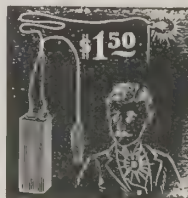
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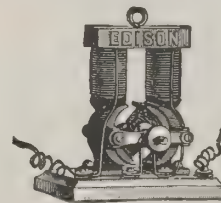
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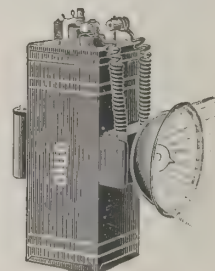
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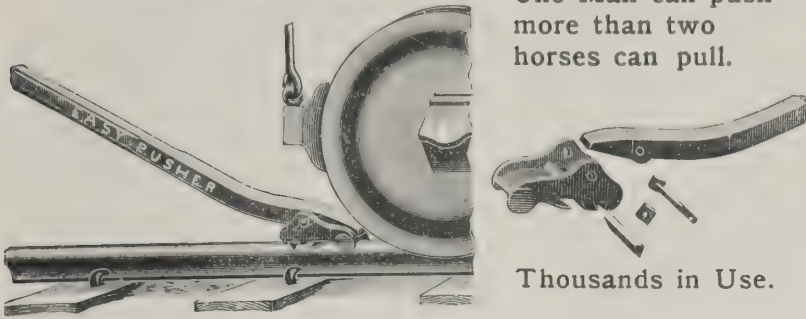
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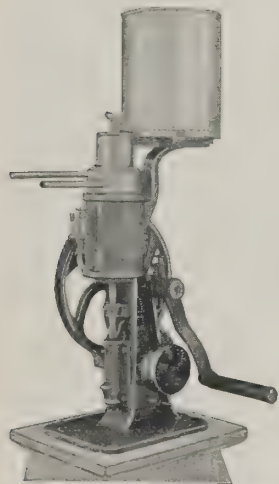
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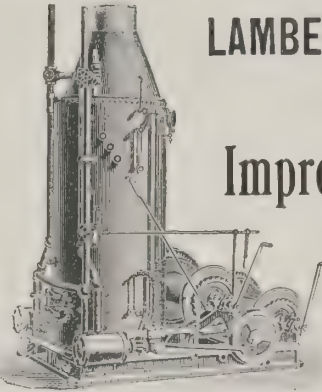
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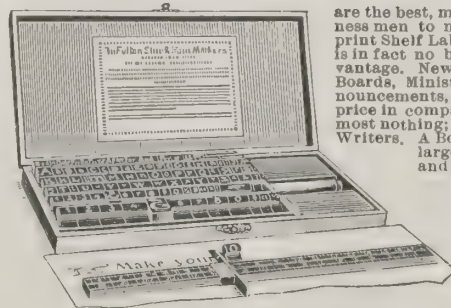
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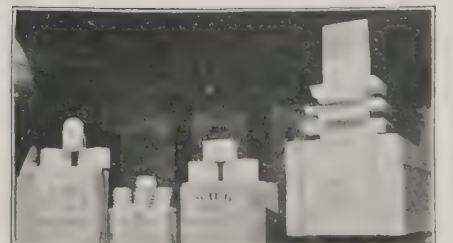
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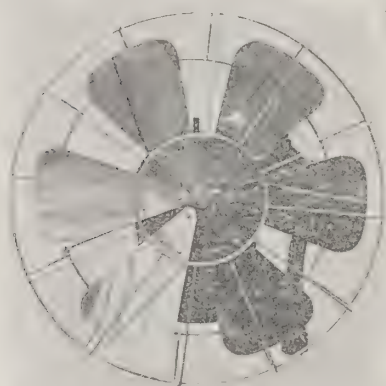




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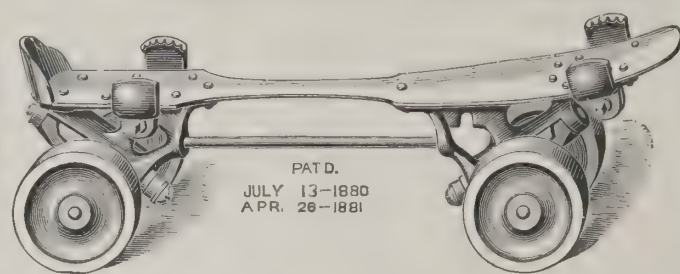


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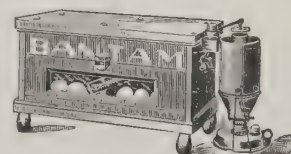
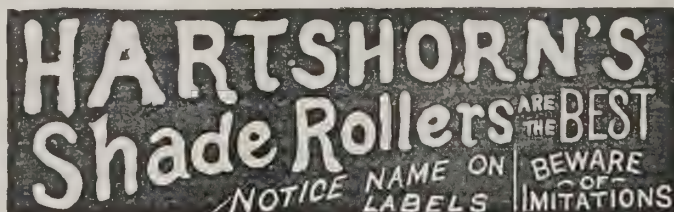
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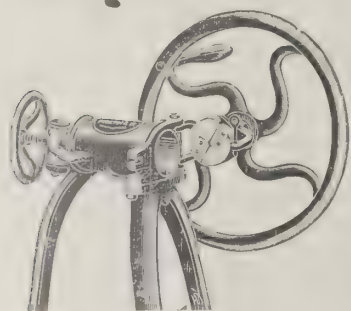
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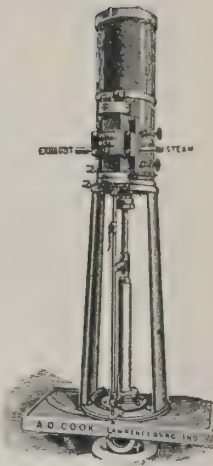
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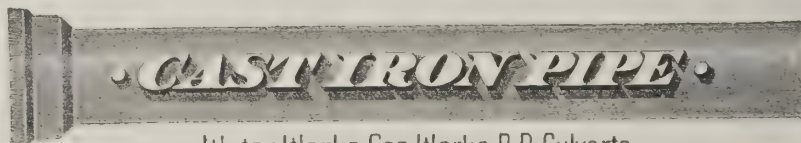
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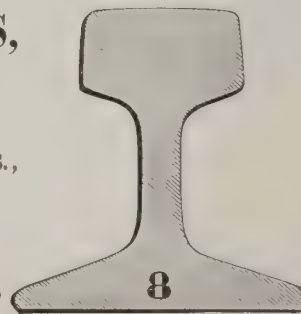
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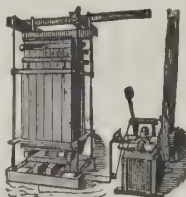


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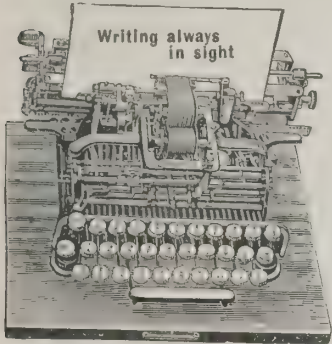


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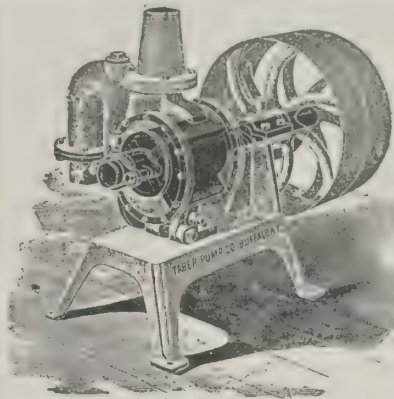
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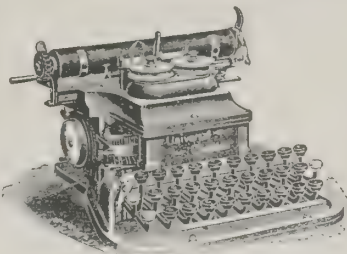
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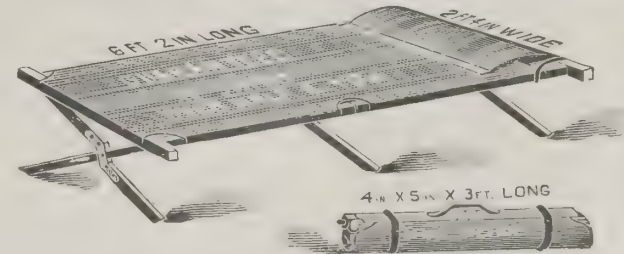
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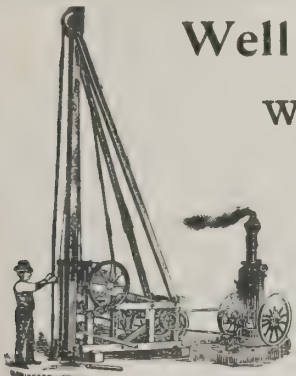
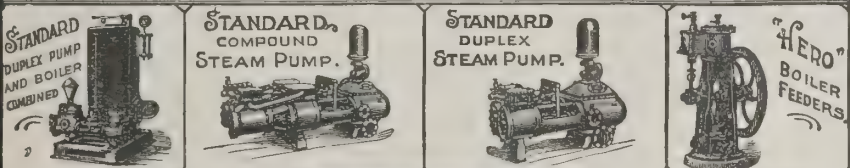
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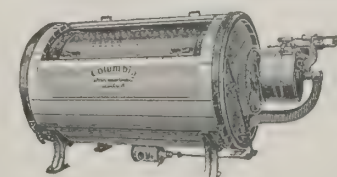
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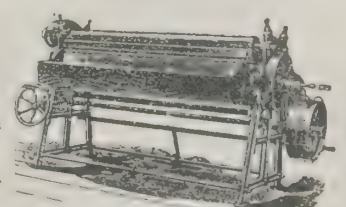
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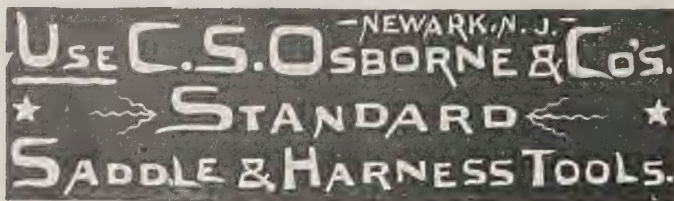
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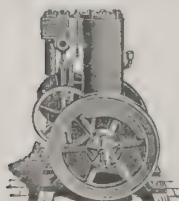
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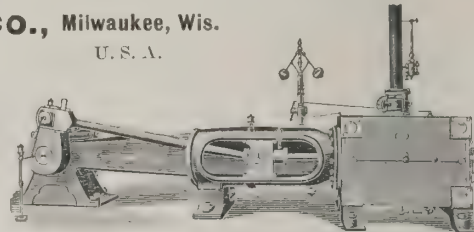
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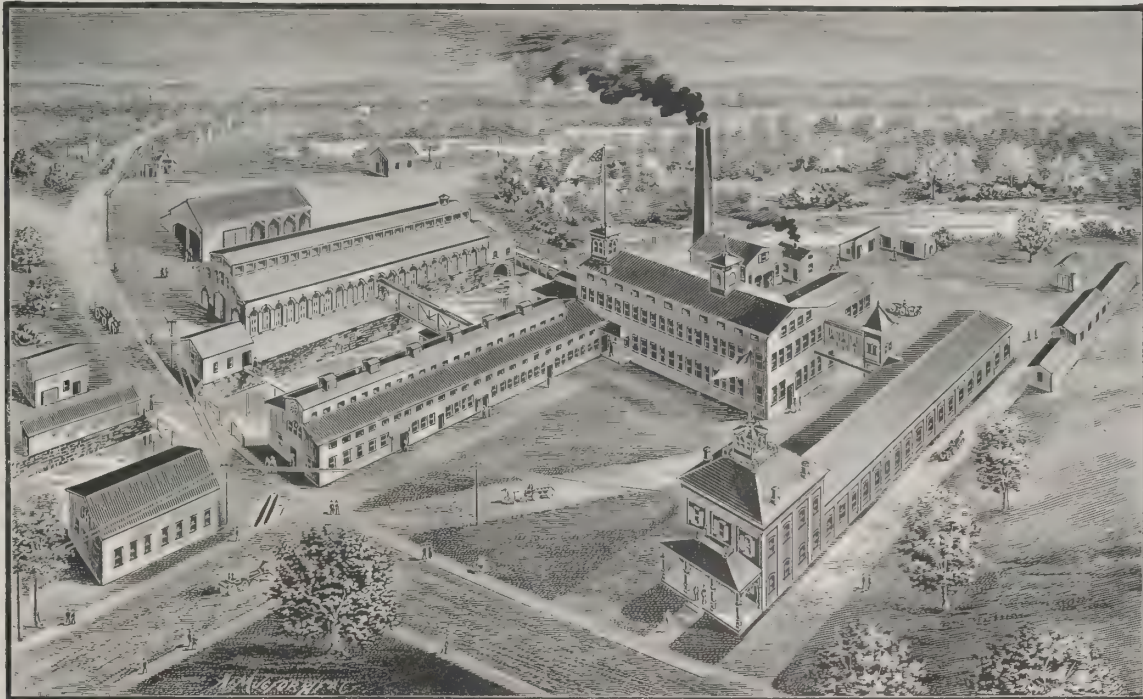


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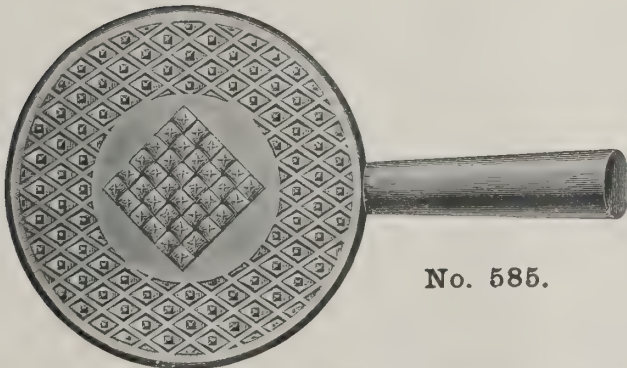
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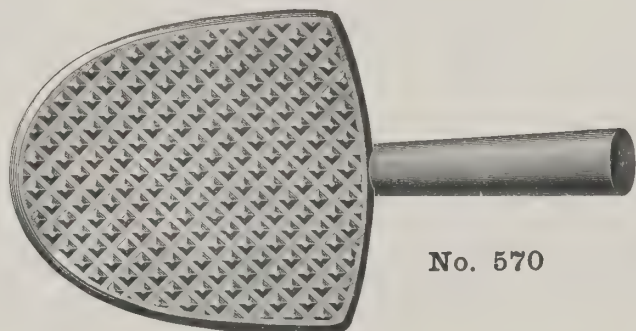
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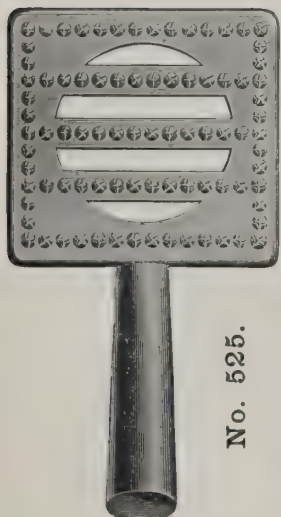
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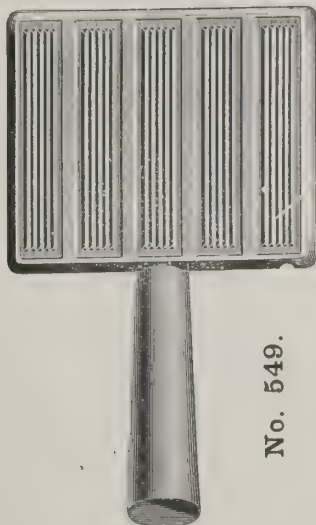
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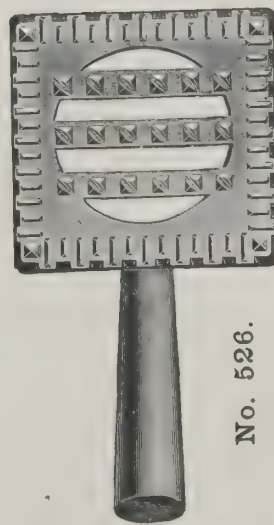
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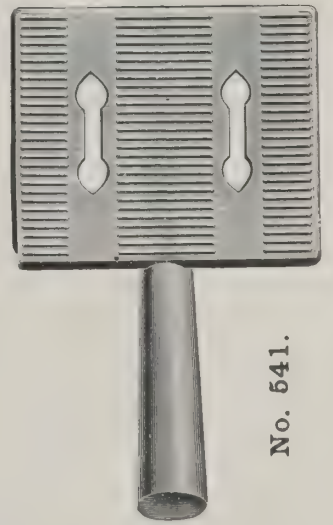
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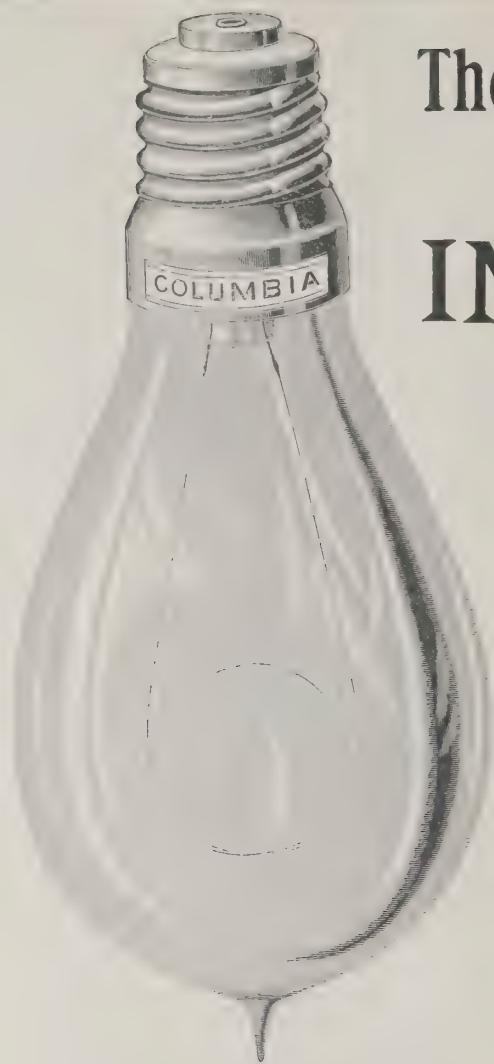


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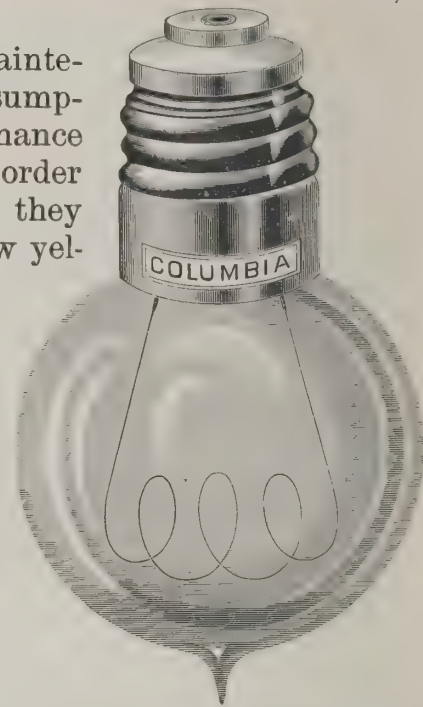
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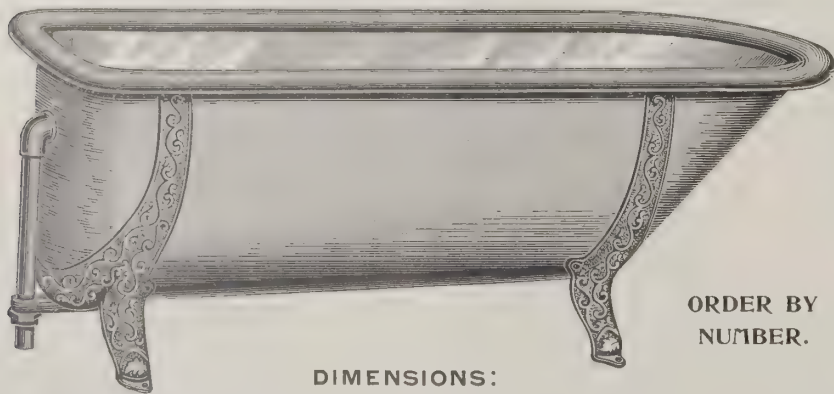
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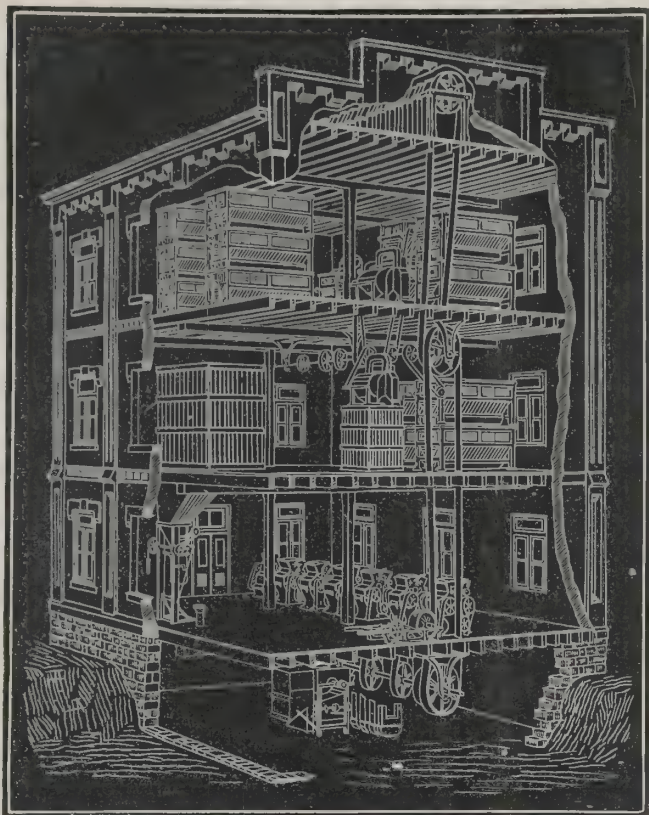
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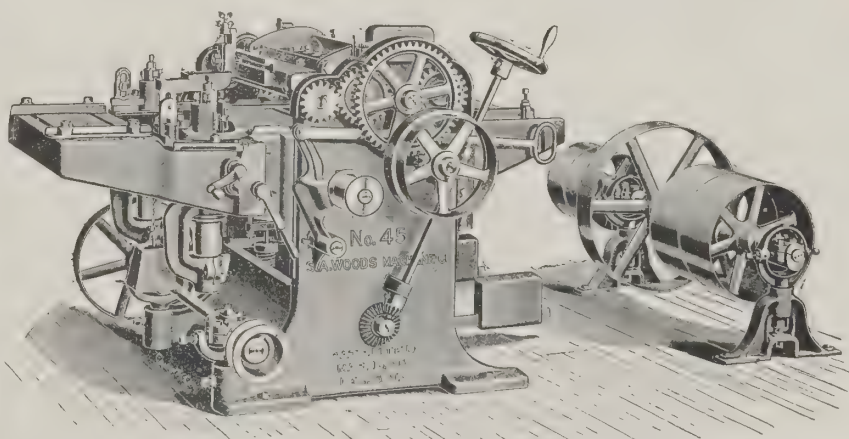


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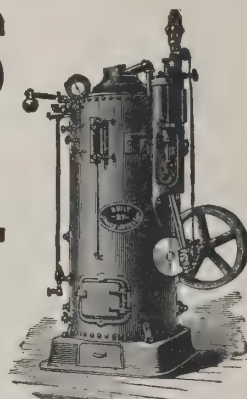
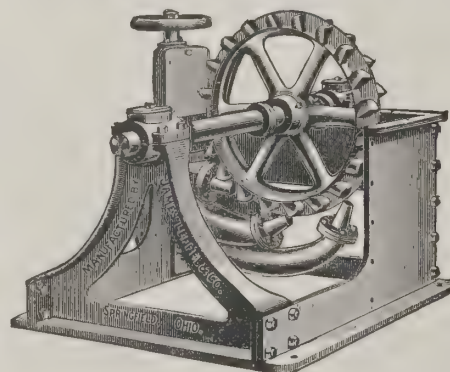
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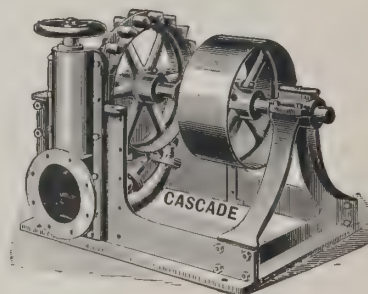
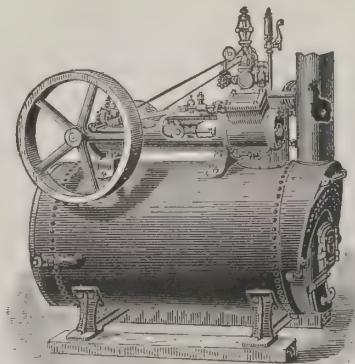
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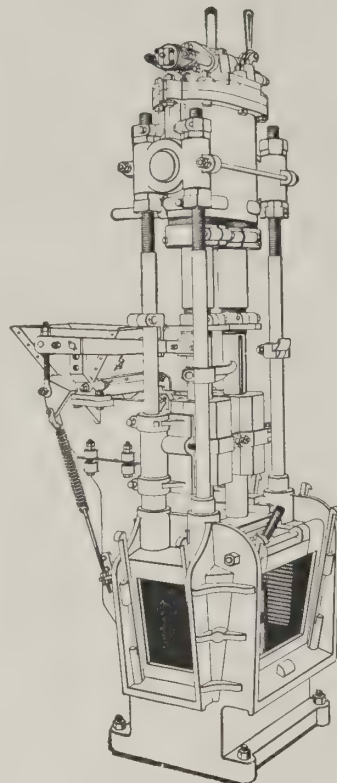
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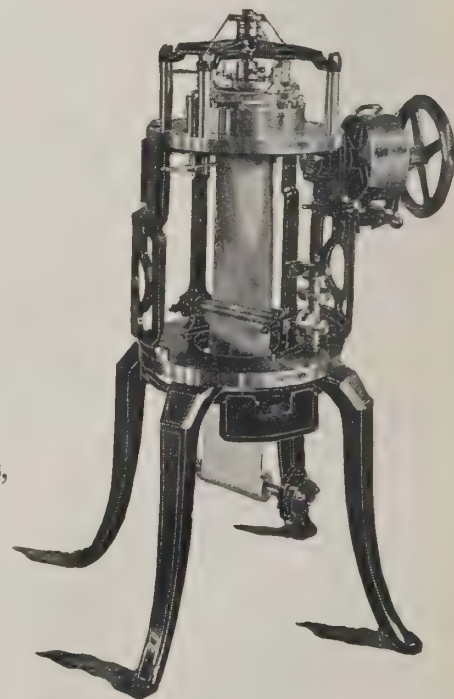
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(Founded by ROOT &amp; TINKER, 1877).

AND

THE AMERICAN MAIL AND EXPORT JOURNAL

(Founded by HOWARD LOCKWOOD &amp; Co., 1877).

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## REVIEWING OCTOBER.

THE past month has shown a very satisfactory volume of business. Exports since October 1st have been larger than ever before. Toward the close there was noticeable, perhaps, a slight but very general lull in trade. This, however, was not such as to give apprehension that there was at all likely to be a slump. It was merely a safety valve of trade. For almost three months the exports of domestic merchandise continued unusually large. Toward the close of that time there came a quiescence in trade circles that might be called a period of caution or recuperation. There is every indication that the trade for November will be all that could be desired, and that a record for healthy increase over the amount for the same month in previous years will be established. But there is no likelihood that it will be extraordinary in volume.

The Treasury statement of the merchandise exports for the month of September and for the nine months ending September 30th are very encouraging. For the nine months the increase over last year's business was \$80,000,000.

The many business factors which exert an influence of most importance are very favorable. The October statistics show that the wheat crops in many countries have been much lower than the September estimates gave. This has tended to maintain values, and a constant outflow of that cereal to foreign countries has made the exports of wheat heavier for the month of October than for any preceding month. The cotton market is not so good, there being a tendency to depreciation of values and slow distribution. It is a most reasonable supposition that a pronounced Winter season which is near at hand will effect a decided improvement. On the other hand, the iron and steel trades report excellent business, with orders which cannot be filled until far in 1898, and many new works are starting up.

An element strongly indicative of the trade improvement that exists and promises to continue is the fact that during the month of October there have been fewer failures, and these of less importance, with one or two exceptions, than there have been for four years.

In the Southern States the quarantine has been lifted from all except Mississippi and Louisiana, and such a frost is expected at almost any day to sweep over these two States as shall enable the quarantine to be raised in them also. The direct effect of this will be to strengthen the tone of internal business and to cause largely increased exports for the month of November.

## THE ENGINEERING STRIKE IN ENGLAND.

WE have waited from day to day with the hope of hearing that the capital and labor difference in England had been adjusted and that one of the most serious and important strikes that ever disturbed the peace of trade was off. At the time of writing, however, the end seems as far away as ever; all offers of mediation from outsiders have been rejected, both sides seem determined and are backing up their principles at great cost and with wonderful endurance. Even though the unfortunate condition of affairs tends to operate in our favor we deeply deplore the circumstances and we sympathize sincerely with our English cousins.

Looking at the situation from an independent standpoint, we are inclined strongly to favor the employers' side of the controversy. We fear that the leaders of the Society of Amalgamated Engineers have outstepped the bounds of reason and seem determined to force most impossible conditions upon the employers—conditions which if maintained would gradually close up all the great factories of Great Britain. Their policy seems to us to be so shortsighted that we are led to question seriously the honesty of their purpose.

The mandates of the society if obeyed would operate directly against the welfare of its members and the mechanical prestige of the nation. It appears as though the union leaders were throwing dust in the eyes of their followers that they might not see the inevitable consequences of an insistence upon some of their extraordinary "shop rules." An instance of this dust-throwing is shown in some of the speeches which announce the startling fact that "no mechanical work of any value can be executed out of England."

The London *Times* in its issue of September 23d published an interview with an American manufacturer which compared the conditions in England and the United States. The subject was ably and concisely discussed by the American gentleman, whose evident experience in the extensive employment of skilled labor made him eminently competent to speak with authority. In substance he showed that with us the hours are longer, the wages higher, and the quantity of work performed greater in proportion to the number of hands employed; a condition of affairs greatly to be preferred by all parties.

Our working day is divided by the noon hour only. There is no stoppage for breakfast, with its consequent loss of time, and our men begin their work in probably better humor and settle down without interruption for at least five hours. We have often wondered why the British workman began his day so early when the total number of labor hours are less than our own, and when every stoppage of a large plant necessitates a loss of time amounting to an astonishing waste in all factories employing any number of hands.

John Burns, the Socialist M. P. for Battersea, wrote: "The fact is that excellence of workmanship goes hand in hand with new and skilled methods, high-class machinery and intelligent, high-paid, well-treated workmen and short hours of employment, and where these conditions exist there trade drifts."

The British workman would do well to ponder over and profit by these words of wisdom from his own special representative, for no truer sermon was ever preached.

Mr. Burns defends some of the principles of trade unions; *i.e.*, the establishment of a minimum wage for day labor only, leaving skill of workmen and recognition thereof to be a matter of bargain and free play between employer and employed. Continuing he wrote: "The establishment of a minimum wage per hour or day is qualified by the union letting the employer have full, free and unrestricted power to dismiss a man on minimum wage the quantity and quality of whose work he dislikes. Unions do not and never did establish a maximum wage which the employer must pay to good, bad and indifferent workmen alike."

It is very far from our desire to decry *in toto* the doctrines and intentions of trades unions. In fact we are strong believers in their usefulness. They are necessary for the protection of the workman. They could and should be made to elevate, encourage and support him. Where they do not attempt to abuse their power they have operated well for the laborer and not injuriously to the



employer. But when they aim to dictate, and, without a thought for the morrow, when they seek to govern and control by arbitrary force the economical conditions of manufacturing trade and in their blind folly strive to deprive their employers of the benefits of improved machinery and its profitable operation, they make themselves the deadliest enemy of the workingman.

The time has come in our judgment when the government should take a hand and enact such measures as will prevent financial disaster to the country and save the workman from himself.

The unions in America apply chiefly to unskilled workers. A mechanic here considers himself in the light of a professional man whose services must be paid for in fees commensurate with his skill and importance. He is apt to resent any act which would interfere with his personal liberty. An instance was brought to light in the courts recently of a man, a mechanic, who refused to join a certain union. Through the influence of the society he was afterwards discharged from six successive situations, although thoroughly competent and willing to work for the wages offered. At last he brought suit against the leaders of the union and promptly recovered substantial damages and an injunction restraining them from any further interference.

The American is probably more selfish than his English brother and the levelling process which aims to make all men equal and to compel the smart and clever artisan to carry his less skilled brother has never become popular in this country, and we trust for the sake of all concerned that it never will.

#### AT THE END OF THE SEASON.

THE Fall season has closed. The disturbance to trade consequent to the recent elections is over and the country has again settled down to work in that confident manner which augurs that the good and busy times brought with the harvest will be continued and strengthened as the Winter months go by.

Now that the returns for the bountiful harvest of this country have been sent circulating through the various commercial channels they are beginning to make themselves felt in trades and occupations farthest removed from the main source.

The past few months have been memorable in many branches of trade and the increasing exports of manufactured goods from the United States are attracting more attention from foreign nations than ever before.

Manufacturers report the business done in farm machinery and wagons to have been good; the domestic trade particularly so, while the foreign shipments were, if anything, above the average.

Our merchants have long complained of the period of stringent times in the domestic market, but as "All's well that ends well" they are likely to look back next year upon that season of depression which forced them to seek foreign markets as not an altogether unmixed evil.

The pages of THE AMERICAN EXPORTER have described many inventions and discoveries in different branches of the mechanical arts that have come recently to do revolutionary work among older methods and machines. The world has been quicker than usual to recognize our inventive genius, which is the mainstay of American export trade and which has aided in no measured degree to make the world richer.

Hitherto cheaper labor and greater natural facilities of other countries have, in many lines, barred us from foreign markets, but mechanical contrivances have so altered the conditions of things that we have been enabled to market abroad staple goods heretofore considered the natural products of other nations. It is highly gratifying to read the fair and courteous comments of foreign journals upon American competition in the iron and steel markets of the world. And now the great inventor Edison has devised a system and constructed a plant for iron mining and ore milling which promises to still further increase our advantages.

New discoveries of gold, silver, copper, nickel and aluminum have kept pace with the ever-increasing sphere of usefulness in a way that seems to us singularly providential.

The demand for American cars and railway supplies in foreign countries continues to increase. There is at present in Chicago a representative of the German Government who has come to negotiate with the Pullman Car Company for a number of palace coaches to be used on the Imperial roads. We predict that this trade will continue to grow until the people abroad have learned how to build their own coaches. Japan has been a large buyer of our locomotives, and now advices announce a sale of twelve American engines for the extension of the Tien Tsin-Lukouchiao Railroad at Peking.

Records show that in cotton piece goods we have done considerably more than hold our own in export trade. In this line Great Britain, of course, easily leads the world with the volume of business in 1896 amounting to 5,220,000,000 yards of piece goods, valued at \$256,000,000. The United States in the year ending June 30th last exported 313,000,000 yards valued at \$21,037,678, but this represents a gain of not less than 78 per cent. over her exports of three years ago.

But it is not alone the merchant and manufacturer who have helped along the growth of their nation. We allude with pride to the work of our scientists. In October we described the latest development of Roentgen rays—an instrument constructed for Dr. Gardner, a Washington professor, which at first test enabled the experimenters to see completely through the body of a man. The great Yerkes telescope, although scarcely installed at the date of our last issue, has begun to add materially to the world's knowledge of celestial bodies.

Lastly comes the invention of Dr. Gates, a combination of microscope and camera, which magnifies 300 times beyond the limit of the best microscope in use up to the present day. This instrument adjusted to and used in conjunction with an ordinary telescope has made plain to the eye each separate pine needle on the twig of a tree more than two and one-half miles distant.

These and many other events of trade, of art or of science may appear in themselves of little moment. They are, however, like straws cast upon water to show the drift of the current.

#### OUR FRUITS IN EUROPE.

IT is seldom that a market exists for any product in which there is little or no competition. That we have such a market in Europe our increasing export trade in fruits would indicate. For some fruits we have few rivals who can compete either in quantity or quality. Our apples have become a European staple, and it must be remembered that our business in this line is very young.

It is only about three years since the exportation of California pears and plums was inaugurated. Though the business was at first disappointing, it was wholly owing to the lack of acquaintance with foreign requirements, best routes of shipment, etc. Foreign importers were quick to realize, however, that they could get a superior quality from us, and the result seen this year has been that pears, plums and other fruits of the Pacific Coast are received in England in prime condition and fetch higher prices than ever before. Nay, the supply has not been equal to the demand. But such a state of affairs need not continue, for our growers are capable of fulfilling any foreign requirement no matter to what extent it may be stimulated.

For dried and canned fruits there is also a brisk demand, especially in Germany, with the exception of prunes, which are supplied very largely from Southeastern Europe. Yet, while there is always a good market for dried fruits, reasonable prices are exacted. Though it is well to bear this fact in mind, it will in no wise be a deterrent, since we can lay down such fruits in Germany say at about two cents over their cost here per pound. In times of immense fruit crops in this country the excess of what is required for home consumption is frequently of great concern and loss to producers. It is a matter of only a short time when a plentiful exportation of American canned goods to Europe will bring about the solution of this problem of waste.



## THE CONSTRUCTION OF TALL STEEL BUILDINGS.

PROBABLY there are more towering steel buildings within a mile of the City Hall in New York than in all the rest of the world. Steel for structural purposes other than for bridges and towers is an American innovation, and is found particularly useful in large cities where the cost of land is high; and as this condition pertains in no measured degree to lower New York, that city has opened up a field for the construction of truss steel frames for giant office buildings unequalled by any other city in the Western Hemisphere. Twenty to twenty-six stories have become so familiar to New Yorkers that they no longer regard such structures as being specially noteworthy. A contractor will run up a great building higher than the spires of the famous cathedrals of Europe, and do all the work within twelve to eighteen months without attracting any marked attention.

The low price at which structural steel is turned out in our mills is one of the leading causes of its adoption as a building material. Heretofore cast-iron columns have been commonly used as supports in edifices subjected to heavy strains, and they are still used to a large extent, but when steel, with its greater tensile strength, became obtainable in the desired shapes, punched and delivered on the building site, for 13-8 cents a pound, a rush of steel tower buildings followed. Naturally one of the first considerations in a building of from 200 to 400 feet in height is the matter of protection for the inmates in case of fire, and no less than forty-seven different methods of fireproofing have been examined and indorsed by the Department of Buildings in New York City. The best evidence of this forethought and care is found in the fact that no disastrous fires have occurred in any of these great steel buildings. The methods of fireproofing are the result of numerous and exhaustive tests, and are doubtless the best that could be devised. The principle of construction involves the designing of each building in such a manner that any accidental interior fires must be confined to a small area. All the steel and iron work is required to be covered with stone, terra cotta or some such substance to protect it from the heat in case of fire. If the steel has become heated to a certain point, and is suddenly cooled by water, it will warp and twist, and perhaps throw the whole structure to the ground, but if carefully and thoroughly protected with masonry and tiling it will bear a hot fire for a considerable time without injury. For these reasons steel buildings are faced inside and out with stone, brick and terra cotta. The stonework is usually constructed so as to carry itself for the lower six or seven stories, and above that the steel has to bear all the weight.

Arches, preferably of porous tiling, are built in between the steel girder floor beams, and the various interior partitions are made in the same manner, with iron doors placed at important points, by means of which a fire can be confined to a certain compartment. In the long elevator shafts there is virtually nothing for the flames to feed upon, and they are always designed to prevent an upward draught of air; yet, to guard against extraordinary contingencies, more than one shaft is usually built, each with its complement of elevator cars to facilitate escape if need be.

Elevators have sometimes been considered a serious source of danger in such buildings, and this fear has been given prominence lately by three serious accidents. Some statistician went to figuring, however, and discovered that so many people rode in the elevators of New York every day that the percentage of injured or killed by accidents was so considerably less than in riding on steam railways that public confidence was restored.

The foundation work of these buildings has presented many intricate problems to engineers and architects. When the brickwork can be placed on the bed rock all is comparatively easy, but sand, gravel and mud present more or less serious obstacles. Pile foundations are most commonly resorted to in such cases, the piles being driven down in groups and tied together with masonry at the top. This tying of the piles prevents danger of spreading and interfering with adjacent foundations. Such a foundation will bear a pressure of twenty tons to the pile, and it is only necessary to

know the weight of the building to decide how many shall be driven. In cases where the lower soil is soft and yielding, as is common in Chicago, foundation beds are made of long steel rails, crossed and set in concrete, so as to afford a support of practically one solid mass. Sometimes, where the soil is found to be very unstable, it has been found necessary to resort to caisson construction, similar to that used in building bridge piers, and to sink these until a solid bottom is reached. This can be done without at all interfering with surrounding building foundations. The caissons are steel boxes, open at the bottom, and they are sunk by workmen inside removing the material underneath. The construction is placed upon them as they go down, and the earth at the sides thus supported. When they get down to solid rock the caissons are filled up with concrete, and form the bases for the piers. In this way a sure foundation may be laid for any building.

The mild steel using in framing is usually required to be of an ultimate strength of 60,000 pounds per square inch, a test being made of some of the metal used in each batch rolled, to insure its uniformity. The columns are ordinarily made in two-story lengths, the section of metal being often in the form of a Z, which gives nearly the strength of a tube, and affords advantages in the way of recess for placing pipes and wires, as well as edges for riveting the cross members. The columns, girders, braces, etc., are all punched at the mill, and set up with large rivets and bolts. An erecting plant is frequently arranged to rest on the steelwork as it goes up, and on this are placed the various derricks and riveting machines. When the outer material for two stories is in place the erecting plant is hoisted to the top, and the inner steelwork placed in position while the erection of the exterior steelwork goes on above.

Hot and cold water supply, electricity, gas, power, and all modern conveniences, are frequently supplied for tenants by plants located in the basements of such buildings. Offices in them are always in demand, and higher rentals are obtainable than in the older buildings of brick and stone.

## TRADE IN THE ORIENT.

DR. EDWARD BEDLOE, the recently appointed Consul to Canton, China, is reported to have said in an interview:

There is a golden future in our commerce in manufactured goods in the Far East. I believe that our best and most profitable markets in the future will be found there. Japan with her 40,000,000 of people. Corea with 12,000,000, the vast empire of China with more than 405,500,000 and Siam and the Spanish, French and Portuguese Indies with another 400,000,000 comprise the territory in which our American merchants and manufacturers should and must compete with those of England, Belgium, France and Germany. The difficulties and obstacles are numerous, but the national trait of Americans is to overcome such things, and by wise foresight of our legislators and diplomats and a study of conditions by our boards of trade and chambers of commerce it can be accomplished. \* \* \*

These figures look very vast on paper and no doubt they are in a sense significant in proportion to their size, but they are rather misleading, and our worthy consul's words are a trifle more rosy in promise than can be upheld by facts. It is very questionable whether our "best and most profitable markets" in the future will be found there as compared with our trade with Europe, the United Kingdom and the South American Republics. Of course we know what the Doctor means but that, as a noted author has said apropos of such instances, "is another story." There are a great many who will take his words for their face value. The Doctor might have added that the countries he named are for the most part so benighted and the people so poor that they do not by any means offer possibilities for trade commensurate with their population or their wants. Great educational and industrial changes must take place in these countries before we can hope to enjoy a great commerce with them that shall afford us our "best and most profitable markets." To be sure the countries are expanding to civilization, and the first steps of progress must bring about a great deal of business, such as the building of railroads, factories, foundries, mine development, etc. There is also a wealthy element to cater to, but if we would look for a permanent and increasing export trade it must come from the demands of the



masses for our products. It will prove a long process to raise the standard of intelligence among the people and increase their rate of wage and their wants. When it does come there can be little doubt that American goods will hold a first place in their markets. The reason for this is obvious. The Chinese immigration to our shores has been enormous; perhaps more than that to all other countries combined. These people have scattered all over the States. Many of them have made frequent passages between this and their native land and there is always an immense correspondence between the Chinese residents and their friends at home. The direct result of this must be that the people of China are at present very well acquainted with "America" and her wondrous products, and there are many and cogent reasons why they would naturally ask for and take American goods in preference to others. Indeed, foreign merchants have already realized this, and according to Dr. Bedloe they have for some time resorted to the pernicious habit of calling any and everything they sell "American," irrespective of quality or make, because they find such representation effects more ready sales. The superior advantages we possess for commerce with China and Japan will undoubtedly determine the supremacy of the United States in Oriental trade. And the varied and high order of our manufactured and natural resources and the cheapness of production will also prove important factors in making us the leading competitor.

### AMERICAN MEAT PRODUCTS.

IT is gratifying to be able to announce that the request made by the United States Government, through its Minister at Berne, to the Swiss Federal Government, that certain charges made by an influential Swiss paper calculated to greatly prejudice consumers of American meats should be withdrawn, has been complied with. The Swiss Government and the paper have promptly made every reparation asked.

This is as it should be, and many importers of American meats will be equally well gratified to learn that justice has been rendered us in this matter. Occasionally in some of the countries of continental Europe there have been almost unexplainable endeavors made to injure our commerce in various animal products. It is owing to the strict investigation of such reports by the proper authorities that we are able to maintain our large and increasing trade in these products. Our shipments of meats in various forms are invariably of high quality, though, of course, there have been notable exceptions. In the case of live cattle many consignments have been found in very poor condition, due solely, however, to long and trying times in transit. We believe American exporters appreciate very keenly that it is only by sending the very best quality of goods to foreign markets that they can hope to build and hold a profitable trade. It is the recognition of this fact, and the living up to it, that is yielding our wares such marked success and preëminence in the markets of the world.

The exportations of fresh beef last year amounted to 225,000,000 pounds, valued at \$19,000,000. This year there is every indication of a decided increase. Hams and bacon are, however, by far the most important items of meat exports, hams to the amount of 130,000,000 pounds, valued at \$12,000,000, and bacon to the extent of about 425,000,000 pounds, valued at \$33,000,000, having been sent abroad last year. About three-fourths of the hams, bacon and fresh beef was sent to the United Kingdom.

At present Canada, Denmark and the United States supply Great Britain with her bacon. During the first half of 1897 there was a great increase in the shipments from this country. For the first six months they amounted to 1,830,162 hundredweight, against 2,501,518 hundredweight of 112 pounds for the whole year of 1896. For the eight months ending August the total value of bacon shipments to the United Kingdom was \$20,465,628, against \$16,260,424 for the same period of 1896.

Our exporters are coming more and more to understand the peculiarities of foreign demand and endeavoring to meet them. There are no lessons so valuable as those bought by experience, and when our exporters have shipped to foreign parts only to find that

their goods sell at a loss or a bare profit they will be quick to realize their deficiencies and try to meet every whim of the trade so long as that is the chief consideration in meeting the competition of other countries.

Perhaps the item of next importance among animal products is lard. Last year we shipped 510,000,000 pounds, of the value of \$34,000,000. In the consumption of this article the United Kingdom does not take the larger part, Germany and France dividing the quantity more equally between them. Of our exports of tallow and canned goods Great Britain is by far the largest consumer, two-thirds of the 60,000,000 pounds of canned goods exported last year being taken by her. Of mutton and fresh pork there are practically no importations, though the trade in the latter will doubtless assume an important position among meat exports as our relations with China increase and the importers there learn the immensity of our porcine resources. The Chinese are said to be very fond of pork. The total exports of fresh pork to Asia and Oceanica for 1896 were only of a value of about \$6,000, so it is readily seen that the market is as yet one almost untried.

### THE VALUE OF INTERNATIONAL COMMERCIAL MUSEUMS.

THE beneficial results which will continue to follow upon the visit of the Pan-American delegates last Spring, cannot be overestimated. In a sense it might be said that the world was ripe for and awaiting just such an initiative as that congress represented. What is understood by the "old countries" had always held undisputed possession of the world's trade. Until recent years we have been an uncertain factor in international commerce; but that we are destined to exert a mighty influence and occupy a leading place in the world's trade relations is being demonstrated every day.

It is not to be supposed, however, that such congresses as that which visited us last Spring will become permanent features. The chief business men and merchants of the world will hardly find it convenient to make such extended and prolonged tours of foreign countries, with a view to studying their manufactures and products and entering into business connections. Time and expediency will soon bring about less costly means of attaining the same results.

That this is true is well shown by the success of the Philadelphia Commercial Museums. The impetus that has been given to foreign trade by the foundation of these and of their Advisory Boards in various countries is very great. The meeting of these Advisory Boards, to be held in Philadelphia in October, 1898, is of vast significance. Such a representative Trades' Congress as this must have an important bearing on our export trade. These Advisory Boards are one of the many good results that followed the visit of the delegates from the South American Republics recently. The latest accession to its membership is the Chamber of Commerce of Kobe, Japan. From assurances at present to be relied upon, there will be forty countries represented at this meeting, including the American Republics, South Africa, Australia, China, Japan, India, and many European nations.

The Philadelphia Commercial Museums are visited by representatives of foreign governments, and by influential merchants thereof. Preliminary steps have already been taken in Germany and Australia towards the establishment of such institutions. Other countries will doubtless soon recognize their efficacy for their specific purposes, and in adopting this method of advertisement there will doubtless be ample opportunity for the proper display of our manufactures and products.

The work that is being accomplished by the National Association of Manufacturers is also a valuable aid. Under the auspices of this organization a sample warehouse will shortly be opened in Caracas, Venezuela, and others will be established later in the various centres of trade in foreign countries. Such systematic effort can mean but one thing—an enormous increase in our exports in the near future.



### TRADE IN BICYCLES.

THE figures of bicycle exports for the first eight months of the year are full of interest. Between January 1st and September 1st we sent abroad \$5,646,000 worth of bicycles, or considerably more than double the amount during the same months of last year, the greatest gain being in the German market, which took a trifle over \$1,000,000 this year as against less than \$200,000 last year.

It seems to us that the foreign trade has caught on to the American fashion of changing the styles of the wheels every year so as to keep up the demand for new wheels, and that a slackness of orders for export may be expected from now until the 1898 wheels are out, as no foreign dealer wishes to carry any more 1897 wheels than he can sell during this year.

There is no reason for believing, however, that the wheels of next year will be different in any essential respect from those of the present. There have been no radical improvements made during the year, and the cycles of 1898 must therefore be much the same as are the '97 wheels. A number of good attachments have been patented during the year, and improved speed-changers and tires may be expected, but nothing conspicuous in the way of change to the wheel itself is likely to be placed on the market. A new chainless wheel, described on another page, will be placed upon the market. At present it is the talk of the trade, but its success is not yet by any means fully assured.

Within the past few weeks a patent was announced for a pneumatic hub for a bicycle, designed to do away with the need of a pneumatic tire, by transferring all the vibration to the centre of the wheel, where it will be taken up by a much smaller pneumatic contrivance less subject to puncture than the tire. Whether this proves satisfactory or not, it is now too late for the season of 1898, and if it comes into use at all it will not be seen before 1899.

It is the lightness and finish of the American wheel which have made it preferred abroad, and now that the prices have come down to such low figures there can be no doubt of a constantly increasing demand for export.

### EDISON'S MAGNETIC ORE SEPARATOR.

THE latest achievement of Thomas Edison promises to revolutionize the iron and steel trade of the world. No doubt this patient and persistent worker has foreseen this, and it has been a constant stimulus to his labors. Years ago Mr. Edison conceived the idea that it was possible to extract iron in paying quantities from what was considered worthless, low-grade ore by the means of magnetic separators. For six years he has toiled with unwavering faith, notwithstanding that all his fellow scientists were against him; and it is now announced that his experiments have been brought to a most successful issue. The provisional plant is capable of producing from 1,000 to 1,500 tons of chemically pure ore a day; and from the time it is blasted till it is compressed into briquettes for shipment the process is entirely automatic. Now that the experimental station has proved a success, other commercial plants on a much larger scale will follow. The effect on the iron and steel trade of this country will be far-reaching and important. Even with the present comparatively more costly methods of iron production we are successfully underbidding our competitors for the world's trade. One of the chief benefits to be derived will be felt by the Eastern mills. They have now to depend largely upon the Lake Superior mines for ore at a distance of 1,500 miles. When the Edison metallic ore separators are in operation it will be possible to supply them with all they can use, and the maximum distance for freight transportation will be possibly not more than 100 miles. Again, the contiguity of these plants to the seaboard will enable the iron producers to export immense quantities; and if all that Mr. Edison claims for his magnetic separators be true, with the almost immeasurable resources of iron in this country, it is quite possible that iron ore can be produced here and laid down in foreign countries more cheaply than it can be mined in such.

The extraordinary reversion that has taken place in the iron

and steel industries of the United States during a quarter of a century is forcibly illustrated by a few figures: In 1871 we imported 1,141,933 gross tons of iron and steel; in 1896 only 265,500 tons. In 1871 we exported to the value of \$14,185,359; and in 1896, \$48,670,218. The price for No. 1 foundry pig iron in 1896 was considered very low; but owing to the improved methods of mining ore at Lake Superior mines and because so much of the ore was near the surface and could be mined at a merely nominal cost even lower prices have ruled for 1897. The causes which have brought about this condition of affairs are still at work, and the results of Edison's magnetic ore separators must be to give to the United States in the near future an unassailable preëminence in the world's supply of iron and steel and their manufactures.

### OUR TRADE WITH THE WEST INDIES.

IT would seem safe to assume that our commercial relations with the Antilles group of islands off the southeast coast of Florida should have suffered a kind of trade anæmia as an effect of the enduring and devastating war in Cuba—the largest of them. The exceeding hostility which has generated against Americans, and all ships under their flag, because of their sympathy with the insurgents might be calculated to still further impoverish trade. A country whose neutrality is unquestioned must expect its exports to suffer in the land where business harmony above all others is jangled and shattered by the strife of arms. When this country's real position has come to be misunderstood or misstated by the unreasoning clamor of the daily press and the headiness of individual enthusiasts it would appear that such a country's opportunities for marketing home products in the war-trod territory should be diminished if not totally destroyed.

Yet it is curious to note that, in the instance of the West Indian trade, these probabilities are disappointing in a fashion most gratifying. One of the British blue books on Colonial trade affords most conclusive evidence to the proof of this, and is at much labor to point out the reasons why exports from the United States have come to supplant English manufactures in these islands.

The advantage of geographical position allows us much closer communication with West Indian buyers. They can visit our marts with little loss of time from their home cares and examine at shortest range our commodities. A better understanding of their wants is resultant, whence we are enabled to supply them with wares more aptly suited to their requirements.

Further, to profit again by the authority above quoted, it is seen that our exports in the view of West Indians possess a marked superiority of finish over the others, which is rendered still more attractive to the purchaser by a proportionate lowness of price. American goods are packed for shipment in such ways as to preclude all possibility of damage in transit, and this important precaution is taken with absolutely no cost to the consignee.

Of course shipments reach their destination sooner than if they had to cross the Atlantic. This in the days of quick business transactions is an item more than any other worthy the profound consideration of importers.

THE Pacific Coast of the United States is the natural base of supplies for Japan, that country of rapid development, which through enlightened government has awakened from semi-barbarism to civilization in a single generation, and it is satisfactory to observe that iron works in San Francisco and adjacent points are liberally supplied with Japanese orders. One concern is reported as supplying eleven marine engines for the Tokio Navigation Company, with an understanding that the order is to be followed by six more to replace some on English and German built vessels. As our ability to undersell Europe in machinery increases rather than diminishes, it is fair to infer that as Japan advances her demand for American products will cover a large range of our industries.

—Consul Reade at Tien Tsin, China, reports to the State Department the arrival there of twelve Baldwin locomotives for the Tien Tsin-Lukouchiao (Pekin) Railroad extension. Eight of the locomotives are of the mogul type.

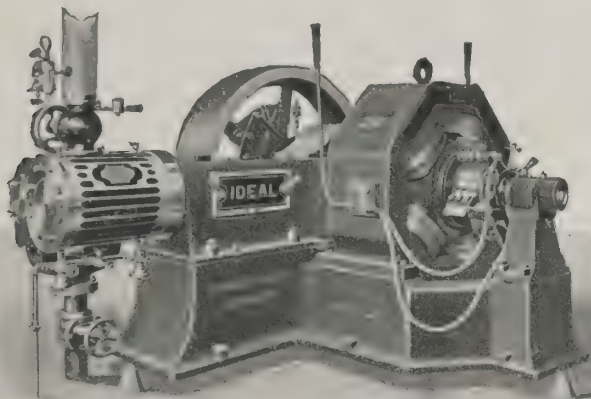


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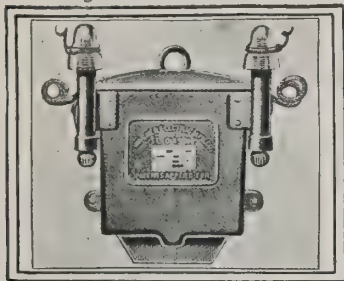
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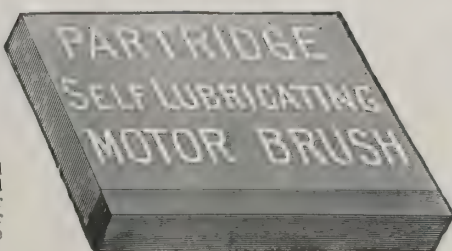
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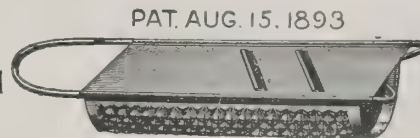
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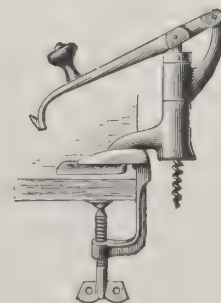
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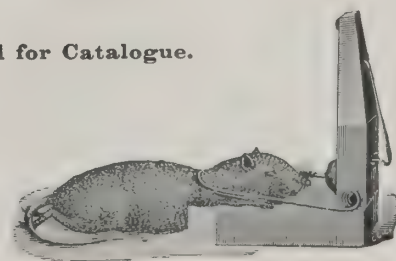
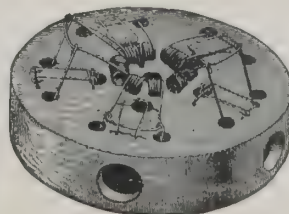
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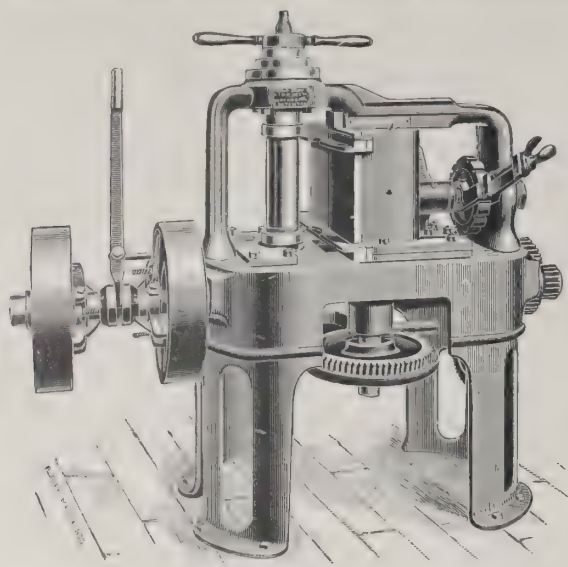
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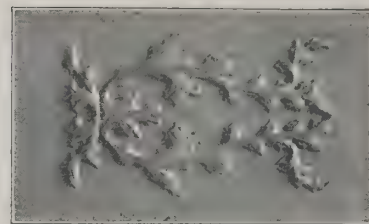
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We guarantee the superiority of our machines in every single particular. Used in the U. S. and Canada by all first-class Furniture Manufacturers as well as several of the best Piano and Organ Manufacturers.

Our machines weigh from 2,500 to 4,000 pounds, possessing weight, strength, durability and adaptability to the work required never before attained in this line of machinery.

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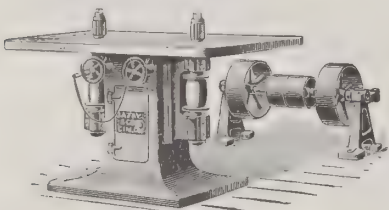
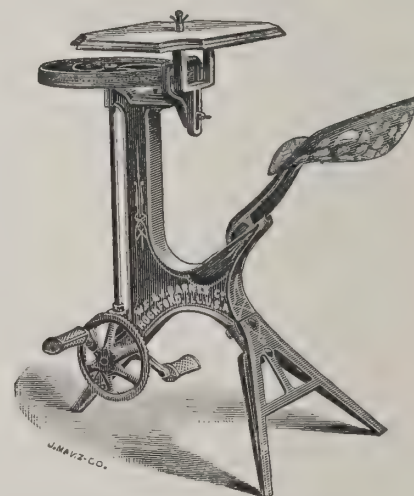
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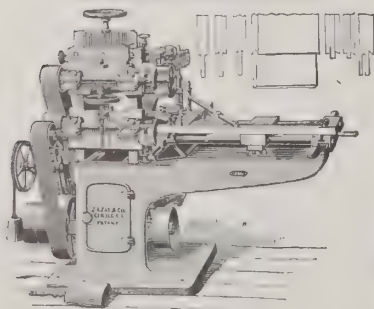
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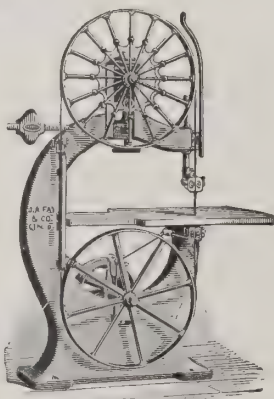
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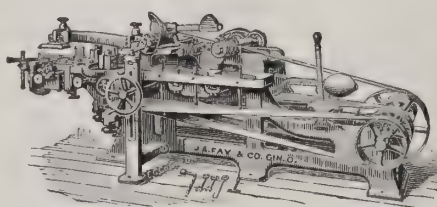


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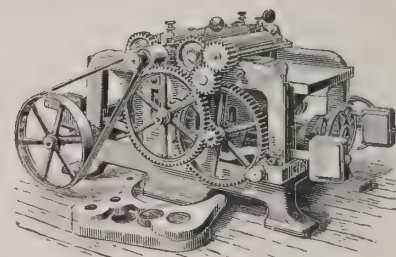
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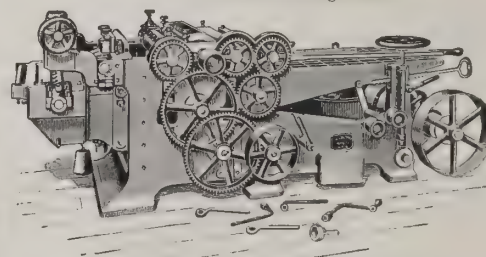
Cincinnati, Ohio, U. S. A.



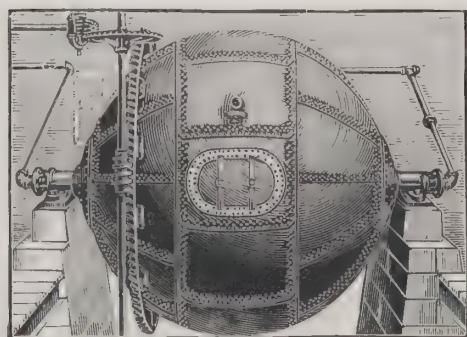
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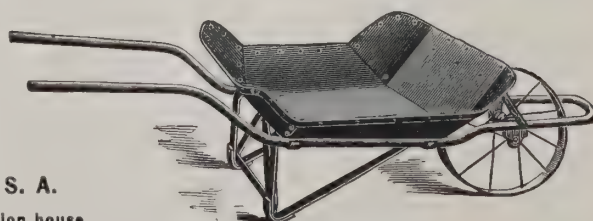
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DEVOTED TO THE FOREIGN TRADE IN MACHINERY AND HARDWARE.

### American Fowling Pieces.

OF late years the American fowling piece has taken rapid strides to the front and has overcome the prejudice of the Englishmen who objected to it on the ground chiefly that it was a cheap gun as compared with the \$250 or \$500 weapon which every man of means in England twenty years ago considered the only gun worth handling. Since then American marksmen have demonstrated what they could do with American guns in several countries in Europe and have proved that American guns are worthy of the highest commendation.

In Europe the chief topic in regard to guns this season is still the single trigger idea. Although guns made on this model have been shown here, they do not appear to have won favor, possibly because of the more severely practical element in the make-up of the American sportsman, who shoots almost without exception in the open, with naturally reared and naturally hunted game. The game in the surroundings of the English coverts, grouse moors, and strictly preserved country, is easier to bring down, and consequently the sportsman over there is apt to give more attention to such things as freaks and fancies in guns. The principal American improvements made recently have been in the direction of greater regularity of pattern—penetration was always a strong point in American guns—and some very fine results have been obtained. At a trial of a gun the other day, fifty shots being fired and the gun being wiped out after every ten shots, the variation between the highest and the lowest result in a 30-inch circle was not more than 8 per cent. For many years it has been regarded as almost a certainty that in ten or twelve shots with any gun there will be at least one weak pattern, and the recorded pattern of a gun is always averaged on that account. So the showing in the trial referred to may be said to have approached the phenomenal.

There is also an increase in the demand for light weight guns, and these run not so much to a lighter weight for a given bore as to a smaller bore. One of the principal firms in this country is now making a line which includes 8, 10, 12, 14, 16, 20 and 24 gauge breech-loading guns. The greatest increase in this demand comes from Texas, the Houston field shots using the light-weight guns almost exclusively. A 16-gauge recently turned out on a special order weighs seven pounds seven ounces, is of Damascus steel blued to resemble fluid steel, and has 30 inch barrels and a 14½ inch stock, the drop at the butt being 1½ inches. This appears to point to a straighter type of gun than was used twenty years ago, when few but Americans could shoot offhand with an American gun. To cater to the demand for light guns there has been introduced stocks of spun aluminum. They are hollow, open at one side, and are very neat and wonderfully strong, but the slight difference in weight will scarcely affect the demand for the old stock of finely seasoned, closely inspected wood. Cheap stocks are generally made of American-grown walnut, but fine stocks are seasoned for from ten to twenty years in most cases and are of English walnut, worth possibly \$3 in the rough; German walnut, worth approximately \$4, and Brazilian walnut, worth \$15. A handmade stock of the last wood is frequently worth \$25. Mahogany is too brittle, and rosewood too heavy. It is possible to-day to buy a really good gun of the finest twist, hammerless, if desired, for from \$35 to \$27.80.

A curious idea is the square-muzzled shotgun, the outcome of a number of experiments by Dr. A. S. Kennedy of Auburn, Me., who sought to secure improvement in pattern and penetration. He took an ordinary repeating shotgun, had it made square at the muzzle, and then improved the shape, grading the four sides of the barrel inward and downward on a bevel. He claims that the result of his experiments is that the shot is practically shovelled into a compact bunch as it leaves the barrel, and so leaves the gun without the tearing pressure made by a round choke.

In the sighting of fowling pieces there is a general impression that the sight proper is of very little use to the average quick shot. Most gun experts say this idea is a mistake, and that the sight is seen instinctively in the act of raising the gun to the shoulder, and that it is of vital importance. Ivory sights have been long in vogue, but not commonly with a rear or breech point of ivory as well as the one at the muzzle, and a still later idea especially adapted for dawn and dusk shooters is a protected piece of glass at the muzzle under which is a streak of self-luminous material.

An innovation on the grass mats used as a blind for wild fowling has been introduced by a New Yorker at a point in Georgia where snipe and waders are plenty and the beach is hard and smooth. This is a grass blind built around a rubber-tired tricycle in which he sits and quietly pedals from point to point

where he has placed stakes, calling as he goes. If birds alight or are seen at a distance he very slowly drifts down to them, and in this way is reported to be making excellent bags.

### Edison's New Milling Plant.

A MOST important advance in the art of milling iron ore is shown in the mills at Edison, N. J., which have been specially designed and equipped with electrical automatic devices by the famous inventor, Thomas A. Edison. These mills are the newest and undoubtedly the most perfect of their kind in the world, and will aid largely in lowering the cost of production to a point that may give American rolling mills a lead over all competitors in the iron and steel markets of the world.

Mr. Edison is very enthusiastic over the result of his work—work which has cost him and his associates in the neighborhood of \$3,000,000, and which has taken eight years of constant planning and experimenting to perfect.

In a recent interview he stated that he believed the process had been thoroughly developed, and continuing he explained about the deposits of iron ore in New Jersey and the scarcity of iron ore, which has been disturbing the mills of the East. He then outlined the work to which he has been devoted for so long a time. It is applying, on a scale of many thousands of tons a day, the principle of a magnet drawing the particles of ore from the pulverized rock.

The magnetic surveys, which were made under his direction by several corps of men, included a whole strip from lower Canada to the Great Smoky Mountains of North Carolina, for the purpose of locating the best deposits of iron.

After being crushed the ore is carried from one mill to another by means of a system of belt and bucket conveyers, either to a storehouse or to the magnet house. If to the latter, the finely divided ore is elevated by an endless chain of buckets to the top of the building, some 100 feet high, and is allowed to drop down through a long series of electro magnets.

A wooden partition is so arranged that the iron, attracted by the magnets, is deflected to one side, while the sand, being non magnetic, falls by gravity to the other side of the partition.

A separate system of conveyers carries the sand off to one side, where it is deposited in a heap.

The iron in the meantime has been dragged up in the air again and is allowed to come down by gravity through a heater, which dries it. On reaching the level of the earth another system of conveyers carries it off to the "briquetting" plant, where it is mixed with a "binder," so that it may be molded into briquettes.

From the mixers another conveyer system carries the pasty black mass of ore to the briquetting machines, which stamp it under great pressure into biscuits about the size and weight of a 1-pound scale weight. The briquettes are dropped then onto another conveyer, and are carried up and down five times while in the conveyer buckets through a furnace, where they are baked an hour. When the baking is completed another set of buckets carries the briquettes out of the building and lands them in waiting ore cars.

One of the chief advantages of this Edison process is the extraction, without waste, of iron from low grade ore. The plant at Edison covers several acres of ground, and is now capable of producing daily from 1,000 to 1,500 tons of almost chemically pure iron, and it does this almost entirely automatically.

The ore worked contains on the average about 25 per cent. of iron and resembles in appearance a very poor quality of gray rock. Mr. Edison says that there are 200,000,000 tons of this ore on the land immediately surrounding his plant, from which can be produced 50,000,000 tons of iron.

A remarkable feature in the working of this plant is that, notwithstanding the immense output, it employs but 145 attendants, and these are but watchers to see that the machinery does not get out of order.

—M. G. Riche and C. Michel, of Paris, France, who represent a wealthy phosphate company of that city, and who own a large plant at Mount Pleasant, Tenn., have been in Pensacola, Fla., making arrangements for extensive shipments of the Tennessee phosphate through that port to Europe. Two cargoes have already been shipped, and if satisfactory arrangements are made with the Louisville and Nashville Railroad for freights the company will largely increase their capital in the Tennessee plant. At present they are turning out about 300 tons daily of the best phosphate rock.



### A Test of Structural Iron.

IT has been frequently foretold by prominent engineers the world over that the tall iron structural buildings so common in the large cities of the United States would not stand the test of time. In view of these contentions a report read at a meeting of the Western Society of Engineers held on the 7th of July last is of peculiar interest and will tend to materially strengthen the iron trade by removing some of the prejudices that have existed against the free use of that metal for structural purposes. The report was prepared by a special committee upon the condition of the ironwork in the old United States Post Office and Custom House Building in the city of Chicago, demolished during the past year for the purpose of erecting a more modern structure. It reads as follows, a brief discussion being attached to it:

"This building was built during the years 1871 to 1875 inclusive and the metal work used was of iron. The floor was supported on concrete arches with No. 14 corrugated iron centres and carried on iron beams. This corrugated iron in most instances shows the original gloss received in the process of rolling and exhibits no sign of deterioration, except where it has been directly exposed to the weather. The corrugated iron and beams appear to have been well painted with red lead paint and most of this paint remains in an excellent state of preservation.

"The only metal work in the building that is found to have suffered from corrosion is the corrugated metal lathing, which was of No. 18 gauge iron. This is found to be very generally covered with a coating of rust which, when cleansed off, is found to be so thin as not to appreciably reduce the original thickness of the plate. Where the lime plaster adhered to the lathing the rust is not so noticeable as it is in the spaces on which no plaster is attached. It is the opinion of your committee that this rusting resulted from the original moisture in the plaster. While some of the ironwork in the roof is found to be considerably rusted it is due to local conditions, such as leaks in the roof or to the iron being near to openings.

"After the wrecking of the building had progressed so far as to leave the iron exposed to the weather it was not possible to determine what the condition of the iron was before being uncovered. Therefore most of the committee's investigation was confined to the two upper floors of the building. In a few instances evidence was found which indicated that the first coat of paint applied in the shop was probably iron oxide paint instead of red lead. The evidence, however, was too slight to be conclusive.

"The conclusion of your committee derived from the examination of this building is that iron properly painted before being placed in a building and reasonably protected from air and moisture does not deteriorate to any serious extent. The iron in this building is apparently in as good condition when uncovered after twenty odd years as it was when first put in place, but the paint covering the same is found to be dry and brittle, having partly lost its life.

Yours respectfully,

"W. M. STEBBINS.

"T. L. CONDRON."

DISCUSSION.—Emil Gerber: A few things appeared in the paper on the old Post Office which are of interest, considered with other discussions which have been current in periodicals, and also in the reports before other societies. The committee state that they examined more particularly the upper floors. During the Winter I had a little leisure and I examined quite a number of pieces which came from the lower floors. In scraping the paint from these pieces it was found without exception that under the red lead there was a paint of the ordinary mineral color which was presumably iron oxide. No analysis has been made of it, therefore nothing definite can be said. A great many of the connections had been cut apart and these indicated that the metal was originally painted in the shop with some ordinary paint, such as is commonly used in shops, and that the red lead had not been applied till after erection, because in these connections where the different pieces of metal had been in contact a brownish paint was very plainly to be seen, appearing almost fresh, and there was an entire absence of red lead.

### A Steam Motor Car.

A NOVEL combination car and locomotive has been built for the New England Railroad Company, which is designed to fill a want in passenger transportation existing upon all roads in that phase of daily traffic which is neither extremely light nor extremely heavy.

In the rehabilitation of a standard dining car, from which the combination car is made, the forward six-wheeled truck was removed and replaced by a four-wheeled truck bearing an upright boiler, and an engine so placed that the cylinder comes forward of the foremost wheels, as on a locomotive, while to the boiler is attached the air pump and other necessary fixtures identified with the boiler head in locomotives. Near the base of the boiler and encircling it is a grooved cast bearing plate, which also rests upon the truck, free from the boiler, and sustains the weight of the forward end of the car, the bearing plate of which, also grooved, acts upon ball bearings  $1\frac{1}{2}$  inches in diameter, 125 of which lie in this circle. The cylinders are 12x16 inches, and the diameter of the driving wheels is 42 inches. The steam and exhaust pipe connections pass from boiler to cylinder inside of the grooved casting, and, moving with the truck and boiler, require no flexible joints. The valve gear is that of the fixed-link type with shifting block, similar to that employed in stationary work. No eccentrics are used, the reciprocal motion being transmitted to the valve by a crank placed upon an extension of the main crank pin, and by the system of lever attachments to the cross head. A modification of the Laird cross head

is used and the wheels of the truck are connected by side rods. The boiler is fitted for burning coke or anthracite coal, and two water tanks of 1,500 gallons capacity are suspended longitudinally under the body of the car, thus enabling the car to run 60 miles without replenishment. The working steam pressure is 250 pounds per square inch.

The Composite, as it has been christened by the New England officials, has made the trip from Schenectady to the Norwood shops of the railroad company, a distance of 315 miles, self-propelled, and developed no untoward symptoms. The introduction of this form of enginery will afford an excellent opportunity for comparison of the relative merits of steam propulsion, thus modified, and the later developments in electric motive forces for local traffic between towns separated by a few miles only.

The new Composite car, seating sixty persons, can haul a standard coach up a 60 foot grade as readily as a locomotive; therefore, a considerable saving is expected, both by reason of the decrease of dead weight to be moved and by a reduction in the number of the crew necessary to operate trains.

### American Hardware in Australasia.

THE Australasian *Ironmonger* in commenting upon a series of short articles that appeared during the past Summer in the *Sydney Morning Herald* and in the *Argus* of Melbourne has this to say: "The paragraph that appeared in the *Sydney Morning Herald* on July 27th commences: 'American hardware is rapidly growing in favor, and it gives promise of gradually supplanting that of English and Continental manufacture.'" It goes on to mention a variety of goods which the special conditions of America have made so suitable for the Australian market that for many years—in fact almost a generation—they have secured the bulk of the trade. It then speaks of the first shipment of American pig iron to the New South Wales market not many months since, and the dispatch of several lots in the interval, due, as we know, to the break up of a ring in the States. Also, that black wire is being quoted in addition to the galvanized. In the *Argus* of August 13th the paragraph stated that during the past few weeks a large number of principals of leading hardware houses have been visiting Sydney to give personal attention to the headway that is being made in these markets by United States competition. It seems that in picks, shovels and other agricultural tools the Americans have got hold of the market owing to the superiority of the articles supplied by them. It is needless to point out, in this journal at least, that all this has been going on for the past twenty years. Either the Sydney correspondent of the *Argus* is very much behind the times or he has been got at by interested parties. The paragraph goes on: "These facts were brought under the notice of the visitors, who are much impressed with what they have seen." As a matter of fact, the only principal of an English hardware house who has been recently in Sydney came for the purpose of ascertaining if axes were being manufactured in the colony similar to the special patterns of his firm.

"Americans, it is true, seem to be making a bid for the wire nail, trade against Germans and Belgians, and will probably do business soon, though it is questionable if much has yet been done. Pig iron from the Alabama iron fields is said to be equal to the Scotch, and is quoted at a lower figure. English makers will need to watch their trade in steam and water cocks, wheel valves, etc., in brass, as the Americans threaten to cut in on this line."

### Great Engineering Feat.

ONE of the greatest engineering feats on record was undertaken and successfully carried out at Philadelphia on the 17th of October last. The old iron span in a bridge of Pennsylvania Railroad—New York division, crossing the Schuylkill River in Fairmount Park—was replaced by a new structure of steel in the space of two minutes and twenty-eight seconds accurately timed.

Owing to the heavy equipment which the railroads are adopting to meet the demands of heavier traffic the old span in the bridge was deemed too light. A new steel span has been in progress of construction for some months on false work erected in the river alongside of and parallel to the old one. It is known as a Pratt truss span.

The problem presented itself how to substitute the new structure for the old. It was effected between the passage of two way-trains over the bridge nine minutes apart. In that short time the tracks were cut from the old span, both structures were raised by hydraulic jacks and settled on 136 iron rollers three feet in diameter which moved on two tramways. These tramways extended on the opposite side of the bridge far enough to hold the old span when the new one was shifted into its place.

At a given signal stationary engines set the shifting process in motion and it was completed smoothly and successfully in less than two minutes and a half. The weight on the tramways was 1,700 tons. The tracks were rejointed and the entire operation was effected without delay to the next train to arrive.

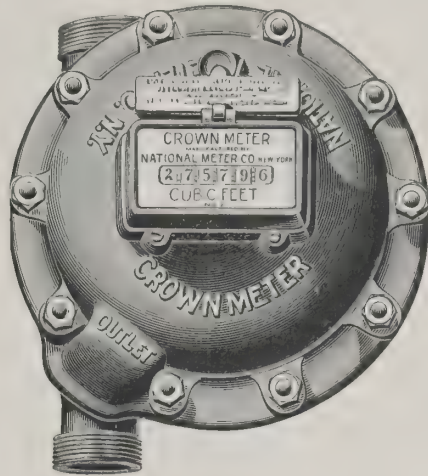
The new span is double tracked, and is 242 feet long, 25 feet wide and 30 feet above the surface of the river. The company, it is believed, will undertake the same engineering feat at New Brunswick before long.

—A new suburban electric road near Cleveland, Ohio, known as the Cleveland and Lorain Electric Railroad, has a schedule of time that calls for a speed of 35 miles an hour, and recently during some trial trips one car averaged 52 miles, and even covered one portion of the road at a 55-mile rate. These figures are particularly interesting as an illustration of the modern trolley line, and also as showing how street railways are gradually merging into a line of business that cannot be distinguished from steam railroad service.



Interesting Information for Water Works Officials about

# WATER



# METERS

They measure correctly the amount of water passing through a pipe.

City of Highland Park, Illinois.

NATIONAL METER CO.,  
298 Broadway, New York.

GENTLEMEN:

Replying to your favor of the 8d inst., would say that the city of Highland Park adopted the meter system in their water works in the winter of 1894-95. The result has been a material increase in revenue from the system, and a decrease in pumpage of at least 40 per cent. The water takers are well pleased with the service, as each pays for what he actually consumes. The city derives another advantage from the fact that leakage is quickly discovered, thereby increasing the economy of operating the system. Our experience has fully satisfied the most skeptical that meters soon pay for themselves in increased revenues on the one hand, and reduced cost of operating on the other.

Yours very truly,

J. C. CUSHMAN.  
Chairman of Water Committee.

They increase the revenue,  
Restrict the waste,

and assist in maintaining a uniform pressure in the water main.



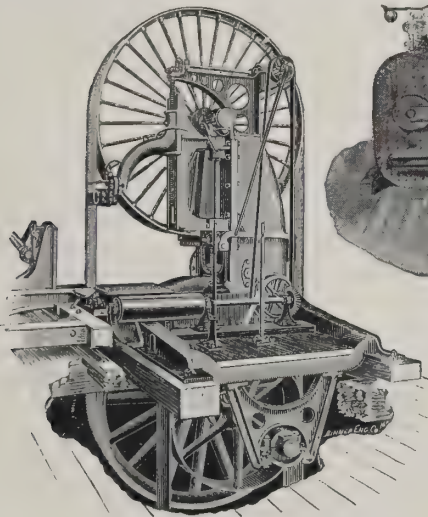
We have many letters of similar character, copies of which we would be pleased to mail you.

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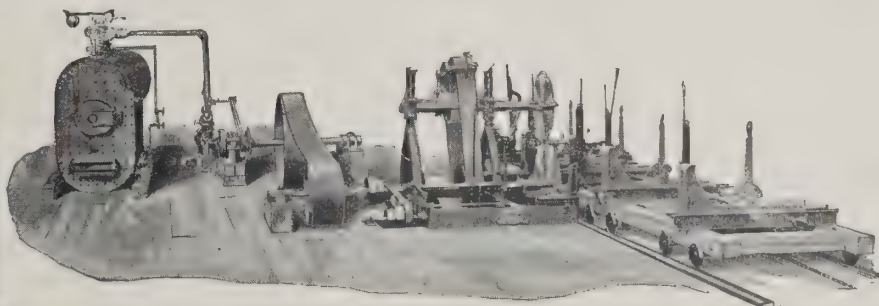
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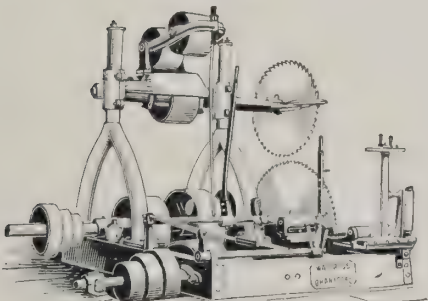
BAND RE-SAWS—For Saw Mills. Increase largely quality and quantity of daily output.

STEAM-ACTING SAW MILL APPLIANCES.

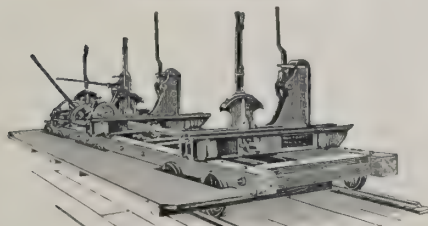
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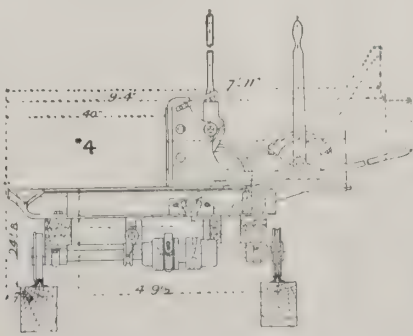
AUTOMATIC CUTTING-OFF SAW—2 men with this machine cut 60 cords of pulp wood 16 to 24 inches long, or 100 cords 48 inches long in 10 hours, taking logs from water and delivering cut wood to conveyor.



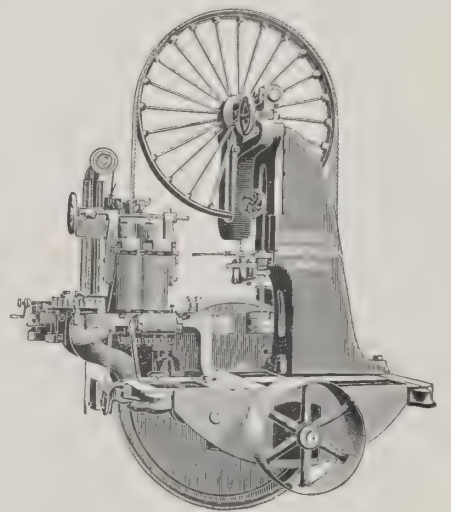
Saw Frame No. 3.



No. 5 Log Carriage.



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### To Cut Pipe Under Pressure.

THE superintendent of a large water company of New Jersey has recently patented an apparatus for effecting the insertion of a valve in a water main under working pressure without having to shut off the supply of water in the neighborhood, an obvious advantage in large or manufacturing towns. The machine consists of a special pipe cutter inserted in a casing of suitable shape, and capable of being operated from the outside of such case with means for removing the pipe cutter and substituting a valve in place of the removed piece of pipe. The pipe cutter is made in two parts, which are first bolted to the main at the point of desired valve insertion. The cut is then made partially. A split sleeve is next bolted on the main around a ring of packing placed close to the cutting collar. The main machine or casing is now bolted around the pipe and sleeve, completely inclosing the cutting apparatus. A shaft projecting through the casing in a stuffing box makes connection with the pinion of the cutting machine, and the cut is then completed from the outside.

After the cut has been made the cutting machine and cut-out piece are drawn up by means of the central rod into the bonnet or dome, and upon closing the horizontal sliding valve at the side of the cut the bonnet or dome may be removed, and a valve specially adapted to this work substituted in place of them. The bonnet is then replaced, the horizontal valve opened, and the valve to be inserted lowered into the space between the severed ends of the pipe and secured in place by forcing the sliding sleeve from without into the large hub of the valve, and by continuing the motion the small hub is carried on to the opposite end of the cut main. The casing may then be removed. Of course in inserting the valve it may be in the open position and left there until desired for use. The joints are made afterward. Mains up to 16 inches in diameter may be handled this way and larger ones by a slight modification.

### Little Things in America.

SOME time ago a French officer of engineers was shown through one of the large machine shops of Philadelphia and his attention was called to the great travelling cranes, the enormous iron planing machines, the big lathes and other large tools, but the visitor appeared to be quite unimpressed and very taciturn. This was attributed partly to the fact that, although he understood what was said to him fairly well, he could speak English only with difficulty. He appeared to be unobservant of the large tools, but was greatly interested in a small, insignificant looking machine used for sharpening the little cutting tools belonging to the big lathes and planing machines. When he had completed his tour of the works and was about to depart he delivered an interesting little speech, of which the following is the substance:

"I have been in America six months, and have visited the mines and manufacturing establishments in the East, West, North and South. I have seen the most gigantic engineering operations and the most powerful machinery in the world, but I shall report to my government that the biggest things in America are the little things. . . . The French people are experts in domestic economy, and live comfortably by saving what your average families throw away. But Americans are, on the other hand, experts in industrial economy. You make money by saving wastage in business, and you lose some of it by wastage in your domestic economy. The attention paid to small details in your big works is amazing to me; I have visited some establishments where I believe that the profits are made not in the manufacture proper, but in the saving of materials and labor by close attention to details that were with us unconsidered trifles. For example, I saw in your shop just now a little grindstone in operation automatically sharpening lathe and planer tools. This machine cost, probably, as much as a hundred of our ordinary grindstones cost; but I see that it automatically grinds all the tools for 300 high-priced mechanics, and it only works a few hours each day. The skilled mechanics in our country frequently stop their regular work to grind their own tools, and then they do it imperfectly. Your tools are all accurately ground to the best shape by the machine, so that they do more and better work on this account in a given time. I believe that that machine has brains—the brains of the inventor—and it has no doubt revolutionized work of this kind in American machine shops. This is but one case out of many that I have noted."

This visitor was more observant than he appeared to be; for he correctly defined a peculiar characteristic of American inventive genius. The great engineering undertakings, the immense manufacturing establishments and the leviathan machinery are, of course, most conspicuous and impressive; but these big things are comparatively few in number, while the novel improvements in little things—usually classed as "Yankee notions"—are legion, and each one contributes its mite toward the general sum of prosperity of the business of the country. An American writer on mechanical topics says:

"The value of attention to detail in shop work is becoming more and more appreciated, and special tools for accomplishing accurately and quickly minor operations formerly done in a perfunctory manner, without method or skill, are among the many advantages resulting from such careful study of little things."

The money value of saving waste of time, labor and material is often surprising. Recently the manager of a railroad company in New England determined to ascertain whether there was any fuel value in the small particles of partly burned coal which are thrown out from locomotive boilers by the strong draught and caught by the spark arresters. These sparks, as the particles of coal are called, collect in considerable quantity in the ashpits at the round-houses, where the fires are raked and the engines are cleaned. They are generally hauled away to some convenient dump. By making a few changes in grate bars it was found that the sparks formed excellent fuel. Several tons are

collected daily, and are now utilized as fuel, the cost for labor and incidentals being very small.

There is a large tin can manufactory at Point Breeze, Philadelphia, where cans for holding coal oil are made by automatic machinery. Even the soldering is performed without the aid of human hands. Formerly a small globule of solder collected at each corner of the cans. A "wiper" was devised for removing this drop, and the saving in solder thus effected amounted to a large sum annually. At the great beef-packing establishments in the West not a hair nor a hoof nor a drop of blood is wasted, and Mr. Armour has stated that his fortune was made not in the profits on the sale of meat, but in the saving of parts of the animals that are always thrown away by the ordinary country butcher.

Not long ago a new material was put upon the market (under a meaningless trade name) for use in certain metallurgical work. This material was sold at a low price compared with the prices of standard materials commonly used for the same purposes. The new compound was tested at a large establishment and found to work well. It was then submitted to chemical and microscopical examinations, when it was found that the compound consisted of sweepings from some factories. The refuse materials had been ground to a coarse powder and otherwise disguised. There was no fraud nor deception whatever in this proceeding; but probably a large margin of profit for a new business was created by simply collecting and utilizing suitable substances regarded as rubbish.

### A Motor Lawn Mower.

A HORSELESS lawn mower and roller combined, the first of its kind to leave a machine shop, has made its appearance, and if the expectations of the inventor are realized it marks another epoch in the passing of the horse. The advantages claimed for it are that it obviates the tramping down of tender grass and cutting of the turf by the horse's hoofs, and that it does much finer work in very much less time at a great saving of expense.

The frame of the main body of the machine rests upon three rollers. The first two are the main driving rollers, the third, which is in the rear, being a castor or steering roller. Resting on these rollers is a substantial platform on which is placed the engine and operator's seat. The engine is a gasoline one of 4 horse power, and can be run a whole day at an expense of 25 or 30 cents. The engine can be started in a minute's time, and can be regulated to a fast or slow speed, as may be desired. It has a governor which regulates the power and speed of the engine.

At a recent public test the mower carried a load of three men up the steepest hills, cutting grass heavier than it would have been possible with a horse-driven machine. The apparatus is so arranged that the engine can be detached from the rollers and cutting device and put to other purposes. The machine when in operation is controlled by ordinary hand wheels, which start it, stop it and guide it, and there is an ingenious device for automatically disconnecting one of the driving rollers when turning a sharp curve, and in this way allowing the machine to turn within a space not much larger than its own length.

### American Locomotive for Africa.

A LOCOMOTIVE was recently built for the Cape Government Railways, of South Africa, by the Baldwin Locomotive Works, of Philadelphia, Pa. The engine is one of six, intended for passenger service, and designed to consume an inferior quality of coal as fuel. They are for a track of 3 feet 6 inch gauge, which is the standard gauge of railways in South Africa. They are of the Atlantic type, resembling somewhat an eight wheel engine, but with the driving wheels set forward of the fire box, and having a small pair of trailing wheels under the fire box, so that the engine has ten wheels, only four of which are driving wheels. The engine is of distinctly American appearance, and is equipped with pilot, circular headlight, extension smoke box, etc., but it has no bell, and the brake hose is not for the Westinghouse brake, but for the English automatic vacuum brake. The crosshead is deep and of the "alligator" pattern, with two slide bars. The rear driving wheels are the main drivers, and the connecting and side rods are all of 1 section. In the equalizing arrangements it will be seen that the rocker over the trailing axle box is connected by hangers, with the driver spring equalizer and with an inverted semi-elliptical spring seated under the rear end of the main frame. The tender has channel iron frames and is carried on two passenger trucks, with inverted semi-elliptical springs, seated on the equalizers.

### A New Planer and Matcher.

A PLANER and matcher especially designed for making hard-wood floors has recently been perfected, a distinguishing feature of which is a finishing cylinder at the tail of the machine. This extra head is of small diameter, carries six knives and runs at very high speed, giving a finish to the flooring which is practically equivalent to a polish. One great trouble in running such a head with several knives has been the difficulty of adjusting the knives so that each does its work. This difficulty has been overcome in connection with this head by a novel method. The knives set into grooves, which are milled out to an absolutely uniform depth. On the back of each knife are two set-screws. After the knife is ground these set-screws are turned so that the distance from edge to end of set-screw will exactly fit a gauge. Then the knives are dropped into the recesses in the head and bolted in place. No adjustment of the knives on the cylinder is necessary and the cut must be absolutely uniform in depth at all times. The thickness of the finished stuff, providing this cylinder is not moved, will be absolutely the same from one year's end to the other.





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Immediate and strong siphonic action,  
With a cistern valve that can be regulated  
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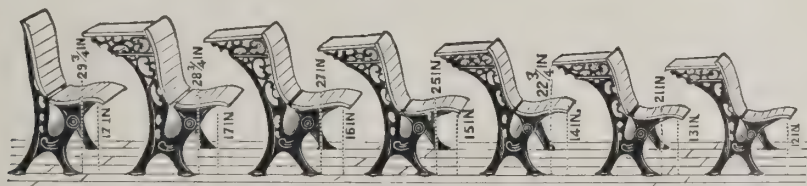
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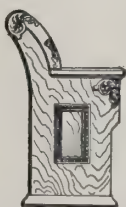
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Faithfully yours,  
ALEX. ALISON, Manager.

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Yours truly,  
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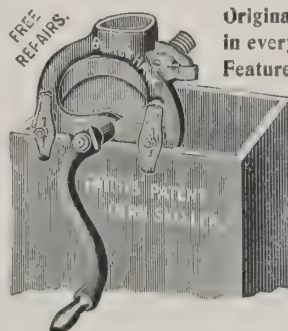
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### Greatest Gun Ever Built.

THERE is now building at the Bethlehem Iron Works in Pennsylvania what will be the largest gun ever built. The enormous piece of ordnance, which has been ordered by the War Department, will weigh when completed 126 tons. It will exceed by six tons' weight the monster gun which Krupp, of Germany, exhibited at the World's Fair in Chicago, and, in length, it will be nearly 5 feet longer than the German gun. It is the biggest order ever given to any establishment in the world. That an American plant can execute the order shows the tremendous strides which have been made in this country during the past ten years.

When the first new ordnance rifles for the rehabilitated American navy were ordered the forgings of the guns had to be obtained in England. That was in 1835. All the heavy guns for the cruisers Atlanta and Boston and for the double-turreted ship Miantonomoh were obtained from British shops. To-day the United States is building a gun larger and more powerful than any piece of ordnance ever attempted in England or on the Continent. The great gun at Bethlehem is being built under the superintendence of John F. Meigs, formerly a lieutenant of the United States navy and a standard artillery authority in this country. With him is associated Captain E. L. Zalinski, United States army (retired). The government inspection work is in the hands of Captain Ira McNutt, of the Ordnance Corps of the army. All three gentlemen are on the ground and personally see to every detail of the immense undertaking as it progresses.

The intention of the War Department, it is announced, is to mount the great piece on a specially built foundation on Romer Shoals. The protection for this gun will be a turret, which will wholly inclose the crew and the greater part of the gun. From its position on Romer Shoals it will have a full sweep of the channels leading into New York harbor. There is not, it is declared, a vessel afloat to-day with armor of sufficient strength to resist its shot. John F. Meigs estimates that a blow from the new gun would have a striking energy equal to that of a 2,000-ton ship when running at full speed. The shot from the gun, he adds, would smash, crack and batter down any armor which it would be possible for a ship to carry. The question of piercing was hardly worth entertaining. The calibre of the new gun will be 16 inches. The length, from breech to muzzle, will be 49 feet 2 inches. Through the breech in a vertical line the gun will have a measurement of exactly 5 feet. Mr. Meigs computes the weight of a shot for the new gun at a little over 2,300 pounds. That means more than a ton of metal. The heaviest shots fired in England have not weighed over 2,000 pounds.

The powder charge for the American gun will weigh nearly 1,000 pounds. Provided extreme elevation for range could be obtained, a shot from the New York harbor gun should be able to travel more than 16 miles. The greatest known range ever attained was from the famous "jubilee shot" in England. The distance measured about 12 statute miles. The United States has never before attempted any heavier piece of ordnance for coast defense than a 12-inch gun. The weight of a piece of the latter calibre is approximately fifty tons. In the 16-inch gun there is observed a jump of seventy-six tons' increase in weight. Just now the Bethlehem establishment is executing an order for 100 of the 12-inch guns. The weapons will be placed at various points along the coasts of the Atlantic and Pacific.

The first ingot for the new 16-inch gun was cast at Bethlehem last month. It was for the tube forging and weighed 82,800 pounds. The jacket forging is also out. It weighs 90,000 pounds. Under the contract made with the War Department the Bethlehem works will turn out all forgings for the great gun. The tempering and annealing processes will also be applied at the Bethlehem shops. When all the parts are out, the tube, jacket and hoops will be shipped to the United States Arsenal at Watervliet, West Troy, N. Y. There they are to be assembled together, and the gun itself rifled and made ready for service. This, it is said, is the present arrangement. All metal used is fluid compressed. The specifications which are being adhered to demand the most exacting physical tests. Specimen pieces of metal are taken from all forgings and are subjected to elongation, breaking and bending tests. Finally, every part of the gun must be of forged metal. The tube, for instance, has been cast and rough bored. It will next have a mandrel introduced through its length and then be placed under the hammer.

For this latter stage the Bethlehem works have the largest hammer in the world. It is capable of delivering a blow of one hundred and twenty tons, or some ten tons more than the famous Krupp hammer. The building of the new 16 inch gun is an expensive undertaking. The gun itself will cost about \$120,000. For single guns the average cost to the government for all fabrication work in this country is roughly \$1,000 per ton of gun. The cost of the gun carriage and turret will bring the cost up to as much again as the weapon, while the cost for foundation will, it is estimated, round out a grand total of at least \$300,000. The foundation for the 16 inch gun will require a depth, it is said, of 50 feet if earth be the basis. This foundation must be constructed of concrete.

### A New Welding Compound.

THE following is from the specification of a recently issued patent. "Restoring the life to metal which may have been burned" we have heard of before, but it is always better not to murder the metal. Whether the mixture described has any virtue as a welding compound, can, of course, be best determined by trial. The compound is sufficiently described by the following extract:

"By the use of my compound a weld may be produced with a heat of any

degree, from a low red heat to a high white heat. The compound acts as a flux to produce an adhesion, which, when the metal is hammered, becomes a firm weld, and at the same time the life is restored to any part of the metal which may have been burned.

"The compound is composed of an intimate mixture of common sand, ground marble, borax, common salt and powdered charcoal, in about the proportions hereinafter named: Common sand, 32 per cent.; ground marble, 50 per cent.; borax, 12 per cent.; common salt, 4 per cent.; powdered charcoal, 2 per cent. The above proportions are not essential, but may be varied within reasonable limits as desired. The mixture is effected in any suitable preferred manner.

"It has been found in practice that a weld may be produced with the aid of the above compound with more ease, more simplicity, and with a lower heat than by any other process or with the aid of any other compound known to me, and that a better adhesion, and consequently a firmer weld, is produced."

### American Locomotives.

AMERICAN locomotives are now having their share of the burden of commerce in Mexico, Brazil, Colombia, Peru, Chili, Ecuador, Bolivia, Uruguay, Argentine Republic and Canada. They have been sent to South Africa, Palestine, Australia, Norway, Sweden, Spain, Italy, Japan, China and Russia. During the ceremonies of the Coronation of the Czar in April last Russia came very near being short of engines to haul the immense crowds. It was not until well on in January of last year that the Imperial Government discovered that they had not locomotives enough to handle the throngs that would be coming to Moscow in April. There were no shops in Europe that could undertake to furnish engines in the time required. The government cabled to a prominent firm of American builders, asking if they could build and deliver thirty-two locomotives in Russia by April 7th. The firm replied that they would not assume the risk of the sea voyage, but that they would build the machines and undertake to have them ready for shipment by fast steamer from this side by April 1st. The terms were accepted; but time had been lost, and it was not until January 20th that the order was finally received to "go ahead." Between January 20th and April 1st—say forty days—there is not much time in which to build thirty-two engines; but American firms are in the habit of doing things after a fashion which on many occasions has astounded foreign locomotive builders. By March 1st sixteen engines were ready for shipment. By March 15th the entire order was completed and boxed, being twenty-five days from the receipt of the order.

A large steamer, the Strathcarr, had been chartered to take the engines over and was to sail from this side not later than April 1st. When everything was ready, except the steamer, the discouraging news was received that the Strathcarr, which ought to have been arriving, had run her nose on a rock and had put into Halifax for repairs, which would take at least a month to complete. Then there was some hustling on this side of the water. Finally two other boats were secured, and thanks to an American firm's ability to do what all the rest of the world thought impossible there were engines enough in Russia to bring everybody who wanted to travel to Moscow, even if there was not much accommodation for them when they got there.

The business which American locomotive builders have done in foreign countries during the last two or three years of hard times has, of course, been of considerable assistance to them individually. It has also been of great help to the United States in furnishing labor at a period when domestic business was almost dead. Even these facts, however, are comparatively unimportant beside the much greater fact that locomotives of American make have during these two years secured a foothold in countries where they had been comparatively unknown, and in sufficient numbers to admit of an intelligent comparison being made between their performance and that of their foreign predecessors. The conditions of roadbed, which are responsible for many important differences between English and American locomotive construction, are in most of these foreign countries so much more like those prevailing in this country than those of England that the result of a reasonable trial may well be a matter of confident prediction.

From a purely technical point of view in the eyes of railway men and locomotive builders the most interesting engines which have been built in this country for foreign use are probably those which have been exported to China and Japan. And the story of their introduction to those countries, if it could be written in full, would be a wonderful one. In Japan the chief difficulties which railways have had to contend with have been earthquakes. Japanese architecture has consisted chiefly of bamboo and paper, and when an earthquake came along it used to find these materials rather disappointing to deal with. But railways cannot be built of bamboo and paper. They have to have solid roadbeds and massive bridges with stout abutments. These things rejoiced the soul of the earthquake, and from time to time he has had great fun with them.

In China the obstacles to the introduction of railways were of another kind. The first piece of track that was laid produced, firstly, a plague; secondly, an eclipse of the sun, and thirdly, a blighting of the rice crop through succession, while the track was being laid by the "foreign devils." Was it not evident that the railway caused them? Therefore, the people rose and tore up the track, killed a native minor official or two and hunted the foreign devils to such an extent as they were able to get at them. There is every prospect, however, that from now on the development of a Chinese railway system will proceed rapidly, and while Russians, Belgians, Germans and Englishmen are all straining every nerve to catch the trade that is coming, it is more than probable that American locomotive builders will get at least their share of the business.



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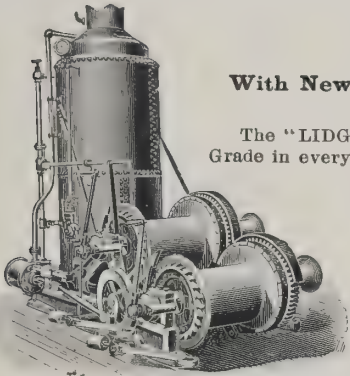
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Any depth from 25 to 5,000 feet.

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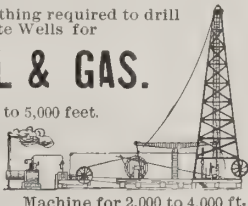
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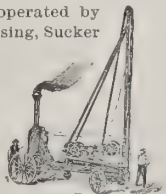
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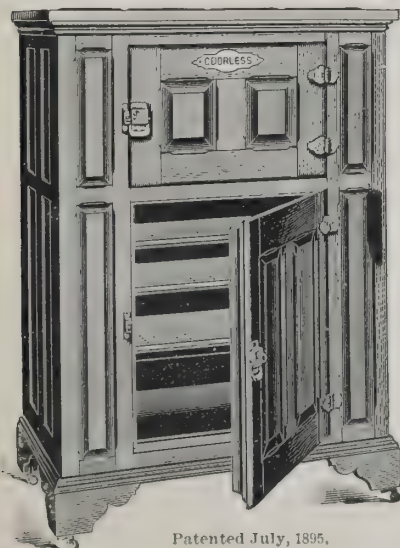
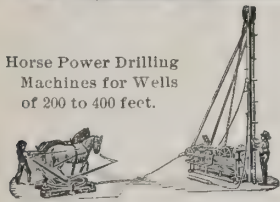


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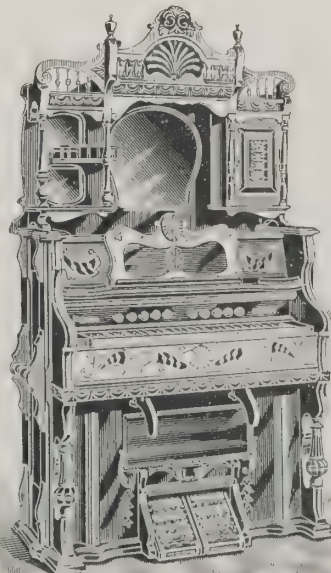
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### English and American Lathes.

THE *English Mechanic and World of Science* is publishing an interesting series of papers describing and comparing the details of English and American lathes. A late issue contains the following:

"Having noted the principal points of difference between the standard English and American lathe heads, we may next trace the means by which the connections are made between the head gears and the lead screw and feed rod and the saddle of the slide rest. In these we shall find the American arrangements much superior to ours. They are more handy, as the headstock gears themselves are more compact and are more readily manipulated. Changes from screw cutting to turning feeds are more readily made, and the lathe man has everything in front of him and immediately to hand. The Americans are ever scheming dodges to save time and increase ease of manipulation, while in England these are generally deemed of less value than durability and power. The results are seen in the greater diversity in design in the former than in the latter, and also in the graver fact that American light lathes are displacing those of English type to a large extent. One cannot close one's eyes to the fact that the former are come to stay. The reason is not that they are cheaper than those of English manufacture, but that they are handier for light work. The same remark applies also to other American machinery, but we are only now concerned with lathes.

"Since preparing the last article the writer has been spending a few days' holiday in visiting shops in the Midlands. In the shops of Messrs. Alfred Herbert, of Coventry, devoted entirely to the production of machine tools, fully nine lathes and machines out of ten are of American type. And the shop is one which is arranged and organized in a most perfect manner in all respects, and the principals are too keen to adopt innovations without good reason. The same remark applies to the shops of the Daimler Motor Company, while in older firms, where the English tools still largely predominate, those of American type are finding their way. The writer heard a gentleman make a public statement that a firm in which he had an interest was equipped entirely with American tools simply because he could not get English ones to do the work. The cycle firms are very largely equipped with American tools. American lathes and machines were much more in evidence at the National Show last December at the Crystal Palace than English ones. The writer is speaking from personal knowledge only, but the agents say, too, that it is impossible to keep much stock, so great is the demand. English toolmakers, when the subject is mentioned, are inclined to pooh pooh the matter, and say that the foreign lathes come here because English makers are too busy to execute orders. The real reason, however, is that the American lathes are handier than English. A proof and commentary on this is to be seen in the fact that some of their best features are being imitated by pushing English makers, while a goodly number of lathes are being built in England wholly on American lines. J. H."

### A Powerful Dredge.

IN its work of hydraulic dredging on the lower Mississippi the United States Government uses a machine that sucks up sand and muck from the bottom of the stream and discharges the material 1,000 feet away. It can be operated up stream or down stream, pushing with the cutters against the sand bar, or dragging them backward. In the stern of the dredge are two "spuds," or piles, which are driven down into the river bed to act as pivots, permitting the dredge to swing in the arc of a circle, sucking up all the sand which comes near the cutters, and, by swinging on one of the spuds as a pivot, the dredge can remove 1,300 cubic yards of bottom without moving forward; it can move forward at the rate of  $5\frac{1}{2}$  feet a minute, and suck up sand at the rate of 8,000 cubic yards an hour, in a short time cutting a channel the full width of the battery of cutters across a sand bar. This enormous sand sucker is 172 feet long and 40 feet wide, and weighs with its machinery, 1,200 tons. It carries ninety tons of coal and has a water ballast to equalize the draft. It has a battery of four 375 horse power boilers, the runners of the centrifugal pumps being 7 feet in diameter. The engines driving the pumps are triple expansion, and are of the vertical, inverted, four cylinder tandem type.

### New Household Devices.

A DISHPAN invented by A. F. Morgan, of Belding, Mich., is divided into two compartments, one for washing, the other for rinsing the dishes, the latter compartment having a removable perforated false bottom for drainage purposes. Small pockets on the sides of the pan serve for the reception of knives, spoons, etc.

Louisianans are famous coffee makers, and Forester Pardo, of that State, has invented an improved coffee pot and boiler. The latter, heated by a lamp or other means, first discharges steam into the drip coffee pot to infuse the coffee, and afterward allows a small quantity of boiling water to percolate through the coffee, an alarm being sounded when the beverage is ready for drinking.

E. K. and W. S. Shappard, of Newark, N. J., are the inventors of a holder for fruit jars, which will be highly appreciated during the preserving season. It consists of a ring formed of two semi-circular metallic sections, hinged in the middle, and terminating in two handles, which are connected by an adjustable spring clamp. The interior of the jar has at different portions rubber cushions provided with teeth for gripping the jars without breaking, and by this arrangement preserving can be prosecuted much more pleasantly, safely and economically than under the old system.

In an improved washing machine invented by J. G. Bibb, of Canton, Mo., a perforated clothes bed is mounted on vertical springs which give it an up and

down movement under the action of an oscillating presser, which moves back and forth over the clothes.

An artificial egg invented by N. S. Clark, of Los Angeles, Cal., is filled with a paste composed of carbolic acid, oil of cedar, eucalyptus oil, camphor balls, water and asbestos, whose exudations through the shell are designed to free nests and fowls from parasites. The shell is composed of kaolin, fruit, feldspar and asbestos, colored to represent any egg desired, and can be cleansed by burning without changing the appearance.

### Giant Steam Power Plant.

THE Metropolitan Street Railway Company of New York, is shortly to erect a 7,000 horse-power central power station, for the operation of its entire underground conduit system. When completed this will be the largest steam plant in the world.

The power house will be situated close to the river front, bounded by Ninety-fifth and Ninety-sixth streets and First avenue. The location is considered to be a little outside of the present centre of distribution, but was selected in contemplation of future extensions of the road.

The building will rest on a foundation of 8,000 piles, covering the whole site, 201 feet by 270. Upon these piles a bed of concrete five feet thick will be spread out. There will be eighty-seven boilers, each with a nominal capacity of 500 horse power, and with a maximum capacity of 800 horse power. The chimney will be the biggest in the country. It will be not less than 350 feet high and 22 in inside diameter. Coal storage bins will be built with a capacity of 9,000 tons.

There will be eleven vertical cross compound condensing engines. Each of these engines will have a nominal capacity of 4,000 horse power, with a maximum capacity of 6,600. As the station will distribute current at a high potential, eleven three-phase alternating current generators will be installed, operating at 6,000 volts. The current from these generators will be led to substations, located at proper points on the lines of the railways to be supplied.

The details are being attended to by F. S. Pearson, chief engineer, and his staff. Their completion will mark an epoch in railway power house construction.

### Gear Wheels with Chilled Teeth.

THE process of casting in chills seems to have been applied successfully to the manufacture of gear wheels which are now made at Newcastle, Pa., under a patent granted to S. E. Maxwell last June.

The chill consists of an outer ring to the inner surface of which are attached pieces projecting inwardly and the inner ends of which are formed to the required shape for the teeth. These constitute the chills, and the effect they produce upon the casting is to harden only the outer surfaces and ends of the teeth, the remainder of the wheel being soft and of course retaining its full strength.

Such wheels have been made and tested very thoroughly in trolley-car service and have given excellent results, the teeth being not only hard, but also accurately formed, and the gears being generally well formed and smooth running.

### Pneumatic Tools in Europe.

THE increased use of compressed air apparatus, more especially in locomotive works, is shown by the fact that there are now 300 pneumatic tools in use in England, 80 in France, 60 each in Russia and Austria, and 40 in Germany. These tools are almost without exception of American make, and every important European railway shop is using or preparing to introduce them, although the price is 20 per cent. more than in America, and the cost of compressors much higher. These machines have all been introduced within the past year, one French firm ordering twenty after a severe trial, and if their use be economical in countries where wages are but 80 or 90 cents per day, they can certainly be employed advantageously where wages are higher.

### Palace Cars for Germany.

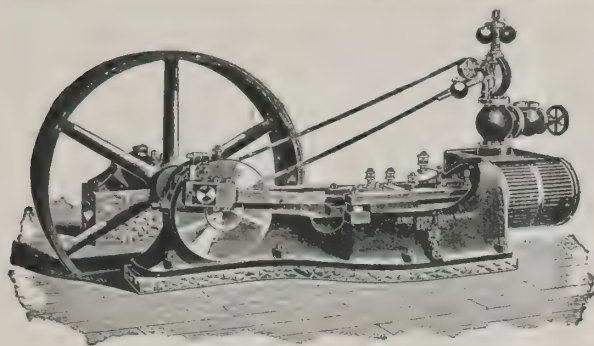
ADOLPH OBACH, a German Government official, was sent to the United States by the Imperial authorities at Berlin to inspect the American railroad system and the equipment of roads, and to enter into a contract with the Pullman Palace Car Company, at Chicago, to furnish the German roads with palace cars.

He said that the railroads in Germany are all owned by the Government, as are also all the telegraph and cable lines. The only Pullman coaches at present in his country are those that constitute Emperor William's own private train. He said the government has long thought of introducing the palace train for the use of the public, but up to this time has taken no definite action.

Mr. Obach will make his first stop at Chicago. There he will visit the Pullman works, and attempt to close a contract with them for a number of their palace coaches for German railroads. He will then leisurely travel westward to Omaha, and perhaps go on to the Pacific coast.

On his return he will inspect everything pertaining to railroads as he goes along, and visit all the large works where railroad equipments are being manufactured. He will stop at Pittsburg on his return and visit the great iron and steel plants in the neighborhood, notably the Carnegie steel mills, where the steel rails are made. When asked if he would also purchase steel rails, he said he was not sent over here for that purpose. From here he will visit all the large locomotive works in Altoona, Philadelphia, Rhode Island and many other places.





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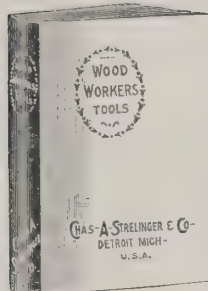
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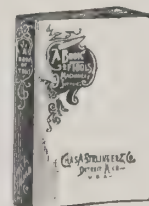
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The second Catalogue is called "Wood Workers' Tools," and contains everything that is required in Wood Working from a Brad Awl to a complete Saw Mill. It is for Carpenters, Joiners, Pattern Makers, and all those who use Wood Working Tools and Machinery.

Either Catalogue will be sent postpaid to any address upon receipt of 25 cents to cover mailing expenses (foreign stamps taken).



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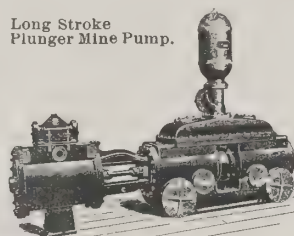
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All kinds, all sizes.



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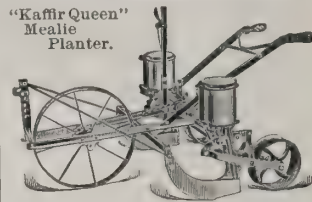


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SULKY PLOW.

Any Size  
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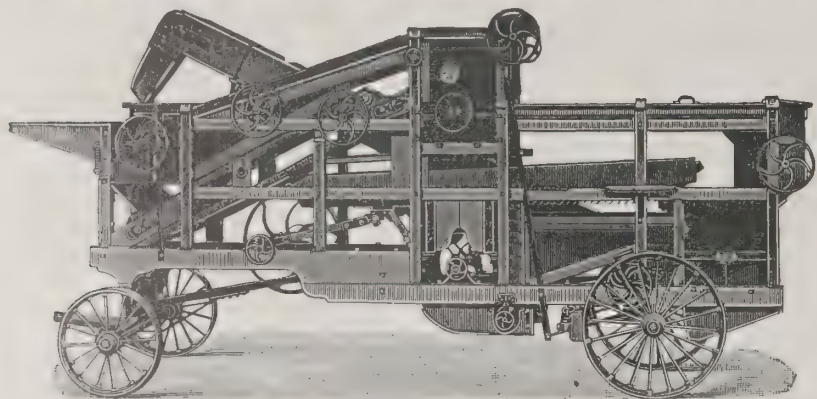
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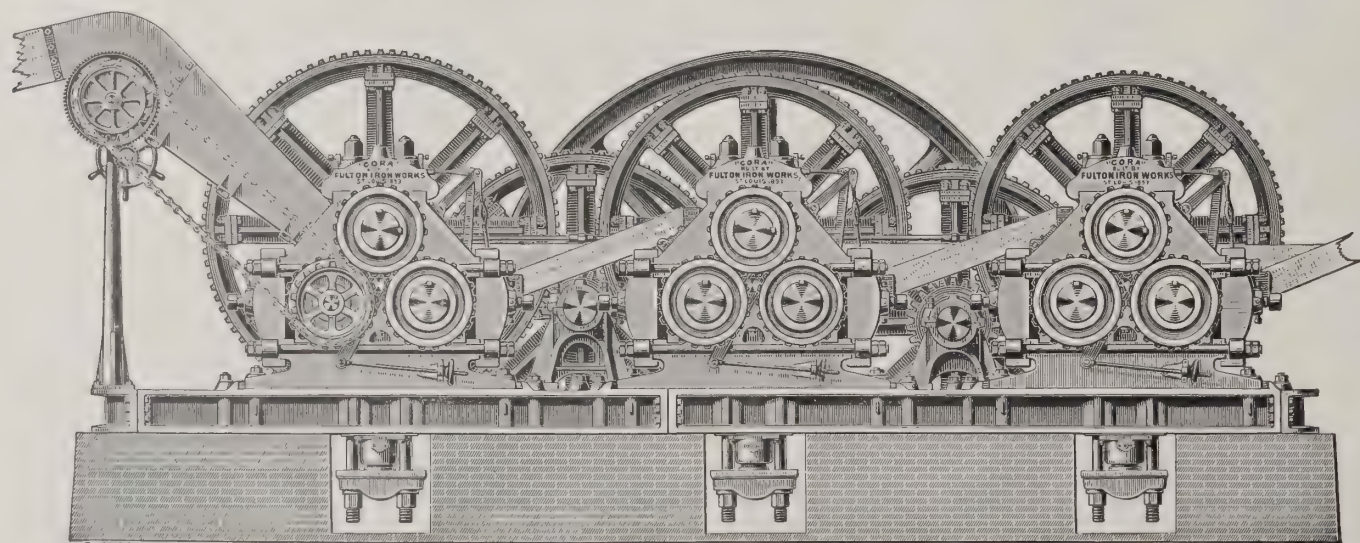
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ESTIMATES FURNISHED.

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Per S.S. "COPTIC."

FULTON IRON WORKS, St. Louis, Mo.

HONOLULU, H. I., June 17th, 1895.

Dear Sirs: The nine-roller mill and Corliss engine built and erected for us by you last year has given perfect satisfaction, and we take pleasure in furnishing you with the following report covering work performed by it during the season just closed. Days grinding, 104 $\frac{3}{4}$ ; Tons of cane ground, 61,617.928; Tons of cane ground per day, 588.238. Extraction: 92.49 per cent. total sugar; 82.13 per cent. of cane; Dilution, 7.91 per cent.; Fibre in cane, 11.02 per cent. Average load on hydraulics, 313.2, 334, 344.5 tons.

It is hard to say just what is the capacity of this mill, as our boiling house is not of sufficient size to admit of a prolonged test, but we would say that we have ground on a short run over 50 tons of cane per hour, and with an increase of from 50 to 75 tons in the load on the hydraulic obtained an equally good extraction. We believe we have the best mill on the Islands.

Very truly yours,

EWA PLANTATION CO.,

E. D. TENNEY, Secretary.





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### A New Binder.

THE people of La Crosse, Wis., are just now greatly interested in a new binder lately invented and brought out in that section, and in a proposition to organize a stock company for its manufacture.

The binder is the invention of a Mr. Brown, of Viroqua, Wis., and it has been tried more or less during the last harvest. The "radical novelty" of this machine is the "hollow traction wheel through which the grain passes to the binder, doing away with the elevating machinery," on account of which, and other advantages, it is confidently believed by the inventor and some who have seen it in operation that it will "revolutionize work in the harvest field"; and apparently sufficient faith in the machine is held by many people in La Crosse to induce them to subscribe the necessary capital to market the machine.

Machines have been made that delivered grain through a "hollow" drive wheel, but none ever proved sufficiently successful to come into practical use, and quite a number of self-binding harvesters of different styles have been produced that did away with the elevating machinery or the elevation of the grain, some of which operated so well and promised so much that large numbers of them were put upon the market, but they failed or did not operate satisfactorily mainly because they had done away with the elevating machinery—binders receiving the grain from an elevation having so far held the market because they handled grain more successfully.

### California Fruit to England.

THREE years ago Enos Davis, a dealer in California fruit, shipped the first carload of navel oranges to England and accompanied the consignment to supervise the sale. The lot went off so rapidly that the dealer a week after his arrival found the fruit selling in London, Manchester, Liverpool and several other points at prices of from 8 to 12 cents apiece, while at the same time Sicily oranges were to be had all over the United Kingdom at 2 cents each. This was but a small beginning from which great things have grown. England has had a taste of California navel oranges and has set the seal of her favor on the fruit because of its size and flavor.

This year for about twenty weeks, or from the opening of the orange season to its close, at least two cars of oranges a week will be set in motion en route to London. Retailing at from 6 to 8 cents each, freight charges, although high, will not hinder the export of the fruit.

During the past Summer a sample carload of dried apricots was sent from California to London and the venture turned out well.

### An Immense Orchard.

PROBABLY the biggest apple orchard in the world is in Kansas. It comprises 1,300 acres, and in a single season the crop of apples has brought the owner \$40,000. Kansas people are beginning to get a large revenue from such by products of the land. A few years ago there was little or no money made from a source that now brings in millions—the dairy and poultry business. These industries are now conducted on scientific principles, and are being taken hold of by college-bred men with special training. The State is enjoying an era of wonderful prosperity. The stories in the press of the rush of farmers to pay off mortgages have not been exaggerated. The farmers have money to cancel their debts, and are getting free of incumbrances on their property.

—A simple instrument for sharpening harrow disks has been invented which has the appearance of a convenient tool for the farm and for shops that have no power. One end of a lever is attached to the axle of the disk and upon this lever is adjusted the grinding tool, which is arranged to meet the circumference of the disk. The handle of the lever extends a couple of feet beyond and furnishes sufficient power to give great force to the grinding edges with little exertion. The sharpener is adjustable, so that the chisel can be set to cut any bevel desired and to work upon any size of blade.

—Several grape growers of Fredonia, N. Y., will ship a carload of Concord grapes to England shortly and will send a man with them. This is done with the hope of establishing a foreign market for the American product. The grapes will be selected from the best and will be carefully packed. A car holds about 3,000 baskets.

### An Important Order for Poultry.

IN the early part of the month a prominent firm of produce commission merchants of New York shipped to Cape Town, South Africa, a consignment of live poultry and eggs that has created quite a stir among the trade and opened the eyes of American merchants to possibilities that never before occurred to them. The order, which came from a large commission firm of Cape Town, through a London house, called for a number of live fowls, as follows: 2,000 chickens, 1,000 pigeons, 1,000 ducks, 500 turkeys, 500 geese, and also 13,500 dozens of eggs. It was completed and shipped within a very few days of its receipt.

The fowls were comfortably packed in roomy coops, and the utmost care was taken to insure them a safe voyage to their distant destination. This is the first order of the kind ever received from South Africa. It is said to be an experiment, but its size expresses little doubt in the minds of the consignees of the complete success of the venture. One of the members of the firm stated to a representative of THE AMERICAN EXPORTER that upon the success of this shipment depends a large and profitable trade between the United States and South Africa. Continuing, he said: "We have taken the utmost care in the selection of the fowls and to provide for their safety in transit. It will take about 50 bushels of grain to feed the lot, and a man accompanied the consignment to guard against any neglect or accident."

This was a timely purchase, for the American market was exceptionally low; but the margin to the shippers was as satisfactory as the price paid by the consignees, so that, barring accidents, the dairy products of the United States are to receive a boom from an unexpected quarter which must soon settle down to a course of regular trading. The eggs in the consignment were packed in neat wooden cases, 30 dozen to the case, divided by strips of cardboard into compartments for each individual egg.

Fowls reach the New York market from all over the country, the Western States of Illinois and Indiana being large consignors. There are specially built cars for their transfer, fitted up with permanent coops, water tanks and troughs, so that, notwithstanding the thousands of miles of railway journey, they invariably arrive in good order, the percentage of loss being very trivial at any time. They are usually sold within a day of their arrival.

Killed poultry and dairy produce of all sorts are kept constantly in cold-storage warehouses in New York at a temperature of 7° above zero. The quantity thus stored is sufficiently great to allow of the heaviest orders from any part of the world being filled upon a day's notice.

### American Indian Corn.

THE demand for American corn abroad this year has been a feature of the export trade in grain that has attracted much attention. Until this year Europe could not be induced to buy our corn. In some quarters it was maintained that the cereal was not fit to eat. Our consuls and commercial agents and even the exhibitors of American cereals have tried in vain to get Europeans accustomed to its use.

This year the conditions of affairs have been such as to force the product upon foreign consumers. There was a wheat famine in Europe and the value of wheat products increased enormously. The poorer people could no longer afford to eat wheat bread and other products of wheat, so they had to have a substitute. Rye has heretofore supplied this when wheat reached famine prices. But the rye crop this year abroad was as short as the wheat crop. Therefore necessity has accomplished what persuasion and argument could not.

It was asserted that this demand for corn would lower the price of wheat. It is years since there was so little wheat in the world as now and the corn crop has never been heavier. The prices of wheat was not materially affected and the price of corn and wheat did not tend to diminish the exports of either cereal. Export corn is now 60 per cent. higher than it was a year ago. It is predicted that owing to the heavy shipments of wheat and corn the balance of trade in favor of the United States this year will be heavier than it has been in years.

—The Mexican Government has sent a well-known Mexican engineer to Chicago to receive the luxurious coaches which have been recently completed for President Diaz by the Pullman Car Company.



### Horses and Sheep for Australia.

THE Department of Agriculture has been officially notified of the appointment by New South Wales of a veterinary inspector at San Francisco to examine and grant certificates of health for American horses to be shipped to Australia from that port. A similar appointment of a veterinary inspector at New York in behalf of Australia was recently made by New South Wales to facilitate the shipment of cattle, sheep and swine to that country from New York only. The Department is further informed that American-bred merinos are the "premium" sheep in Australia, and that the breeding and shipping of such sheep to that market is becoming more and more popular.

### Cornstalk Cutting.

AN exhibition of cornstalk cutting was given some weeks ago on an Illinois farm. A committee of farmers weighed the stalks, hand picked and shocked a week previously. They weighed 3,660 pounds to the acre. Those cut and gathered by the machine weighed 2,880. The stalks were down badly, but it was demonstrated that the stalks would run from a ton to a ton and a half an acre, which heretofore has been almost a total loss to farmers.

Now by selling this heretofore waste product to the cellulose factory which has been established at Chenoa, in Illinois, they will gain from \$3 to \$5 per acre. The cellulose company will require 30,000 tons of stalks to begin upon, for which they will pay \$90,000. Three cutting machines of prominent agricultural implement manufacturers were tried at the exhibition and the farmer judges were greatly pleased with the test.

### A Bed of Gems.

AMAN named Selig, a farmer who recently moved to Ranken, a suburb of Troy, decided to have a well dug upon his new premises. After going down about ten feet the workmen struck bed rock. When this was penetrated the workmen came upon what bears strong evidence of being a bed of diamonds. The stones are of various shapes and sizes and glisten with a brilliancy which creates strong confidence in their value. Mr. Selig secured several specimens and has sent them to Washington to be examined and their value estimated. The news of the find has aroused intense interest and hundreds of people have visited what is already called "The Diamond Fields."

Old records show that the belief long ago prevailed that gold and precious stones were to be found in this vicinity. In the first lease of the Ranken land, given in 1790, it was provided that all gold discovered be reserved by the lessor, Stephen Van Rensselaer. Prior to 1790 the Indians were known to have specimens of gold and it was believed that they found them on this land. So confident was Stephen Van Rensselaer that the land was rich in mineral deposits that he had the reservation clause inserted in the lease which he gave to Jacob Schermerhorn in the year named. The annual rent, by the way, was twenty-eight skipplles of wheat, four fat fowls and one day's work. The wheat and fowls were to be delivered at the patroon's mansion in Albany. No gold was found by the old settlers on this land, but it is contended now that since Saratoga County has a gold mine it would not be surprising to find not only that precious metal here, but diamonds also.

### America's Prosperity.

REFERRING to the improved business conditions of the United States a recent circular of Henry Clews & Co. says: "Step by step the great recovery progresses and has now reached every branch of trade. In some industries manufacturers are taken by surprise at the expanded prospects that are opening up before them. It is something more than had been hoped for that within six months our whole range of home markets should have risen from comparative prostration to a state of healthy prosperity. But added to this we have plain evidences that our growing grasp upon the export trade—which had been regarded as only an incident of the exceptionally low prices connected with the depression—is a natural result of our national development which has come to stay and to give us a new and profitable expansion of our trade. This new drift has become especially conspicuous in the iron trade, in which our manufacturers are easily taking large orders over the heads of foreign competitors, and also in the electric industry, in which we are equally successful."

### Aluminum in the Printing Trade.

ANew use for aluminum seems to be found every day, and its value to manufacturing and other trades is becoming more and more apparent. It has lately been found serviceable to the printer and lithographer, and experiments made with it have given general satisfaction. A very large use for it which has already found its way into the market is the use for lithographic plates. At present all such work is done on flat bed presses from stones, which process is slow and tedious, not more than 8,000 impressions being made in a day.

By the use of aluminum plates, however, they put the transfers on an aluminum plate and bend this plate around a cylinder, so that the printing is done from a rotary surface in the same manner that the daily papers are now printed. The limit of speed in printing this way is practically the rapidity with which the sheets with the impressions on them can be removed from the mouth of the machine. Only a given number of men can work around the delivery end of one of these presses and the limit of these presses in printing is somewhere about 25,000 impressions a day.

### Coinage Plant for China.

DISSATISFACTION was expressed some time ago by a leading viceroy of China, Liu K'un-yi, that the copper coin known in that country as "cash," and struck by the foreign machinery of the Canton mint, was too heavy and was apt to tempt counterfeiters to melt it down and coin lighter "cash." The Imperial Government then ordered three new additional coinage plants, and the order was given to the United States and executed in New Jersey. The plants are now actively operative either at or near Peking, and are under the immediate supervision of the Emperor. Two of these plants were designed for making "cash"—of ordinary brass, or of two thirds copper and one third zinc—for use and circulation in the northern provinces of China, and at present are reported as turning out some 700,000 coins per day, each machine making 100 per minute.

The third coinage plant of American construction was completely fitted up, if not originally designed, for producing five sizes of silver coins, the exact counterparts, except in respect to inscription and design, of the United States 5-cent, 10-cent, 25-cent, 50-cent and \$1 pieces, the last containing exactly 412½ grains, the United States silver standard.

The American company which constructed and is now operating the three new plants was instructed to copy in its products, as far as the general design was concerned, the patterns furnished by the government, and which were probably made at the Canton mint. But whether the designs of these coins originated with Chinese artists or in England is not known.

From an artistic point of view the American-Chinese coins are claimed to be a great improvement on the original patterns or designs, more especially in respect to the dragon's scales and muscles, and also the lettering of the inscriptions.

For what purpose the actual duplicate coinage of American silver, so far as size, weight and current bullion value are concerned, has been entered upon by the Chinese Government is not known and is difficult to conjecture. Whatever else may be predicted of the immense ignorant and geographically isolated people of China, nothing can be more certain than that John Chinaman will never take a piece of silver in trade, or in exchange for service or indebtedness, for more than its bullion worth as pure silver, no matter what stamp his government or some merchant may put upon it. Some one may, however, have persuaded him that things are different among the barbarians who live afar off and do not belong to the Celestial Empire.

### A Modern Diving Bell.

THE American Wrecking and Salvage Company has devised and constructed a diving bell that is claimed to be far ahead of any other type yet put into service. Public attention has been called to the special merits of this device by the recent recovery of the cargo of a steamer that had been submerged for thirty-two years, and all attempts to bring the copper that had gone down with the vessel to the surface had so far proven unsuccessful. The Smith diving bell is thus described by an exchange: The bell is a cylinder eight feet high and with a diameter of about six feet. There are five windows in the bell, and from them a series of arms are operated. These are operated from the inside of the bell, and the divers are thereby enabled to handle immense weights, or to pick up an article as small as a teaspoon. In raising the cargo of the sunken steamer alluded to, all kinds of tongs, rakes, drags, hooks and other implements were attached to the arms and used to search every nook and cranny of the vessel. The debris was cleared away from the lumps of copper, which were secured by ropes and tackle, and hoisted above water by a crane and hoisting engine.

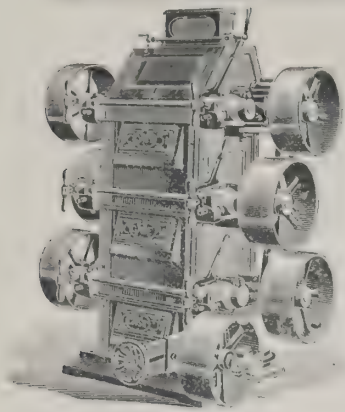
The estimated depth of water from which the copper was raised was about 165 feet the pressure being about eighty pounds to the square inch. The diving bell is made habitable by air tubes for pumping in fresh air and exhausting bad air. It is also equipped with electric lights and a telephone. It is constructed of inch thick steel plates, and the arms used as stated above are of one inch square rolled steel. To those familiar with the old type of diving bell, it can be readily perceived where the modernized apparatus has its advantages.

### Automatic Kiln Regulator.

AN electric appliance has been devised which regulates automatically the firing of pottery kilns where natural gas is used. Besides this, it registers each degree of heat with accuracy, as the firing progresses in conjunction with an electric clock. In case the gas pressure into the kiln is too great, this same device automatically shuts off the surplus. If too little, it opens the vents of supply wider to admit more, so that the requisite degree of heat is maintained all the time. For example, if a temperature of, say, 2,600 degrees is to be reached by gradual stages, the automatic register is set at the various degrees required at stated intervals, in conjunction with the electric clock. No other attention is then required, and when the proper time is indicated by the clock, and the burning is complete, the supply of gas is instantly shut off and the kiln begins to cool. With this appliance there is no need of a fireman to stand at the valves of a pottery kiln, in order to regulate by hand, and according to his personal judgment, the amount of gas required to maintain, in all parts of the kiln, a steadily increasing and equal degree of heat. No fireman can always turn on an equal amount of gas from the many valves surrounding a kiln, but this new device does it with unfailing and unerring accuracy. It is absolutely correct, and there is no possibility of its making a blunder. An automatic register traces on a chart the gradual rise in temperature through regular stages until the required degree of heat is attained.



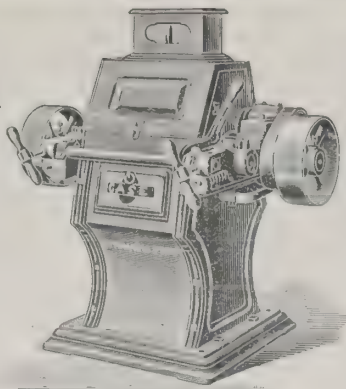
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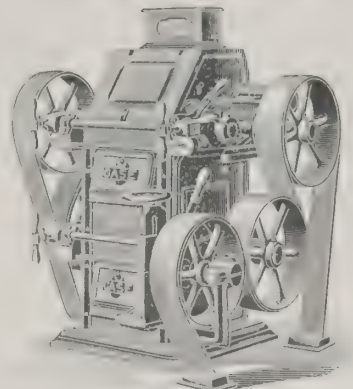
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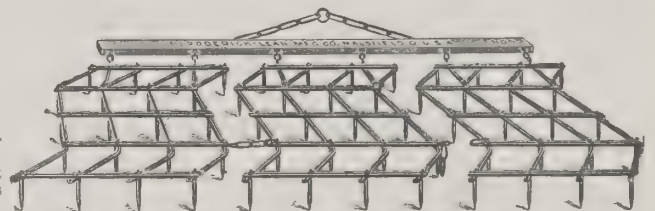
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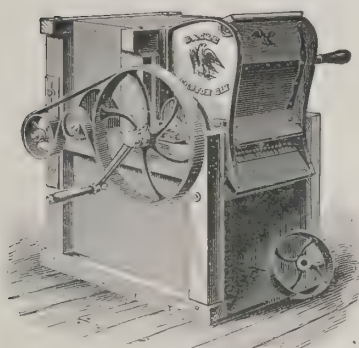
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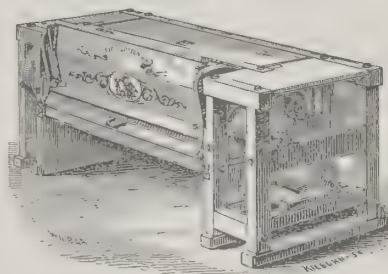
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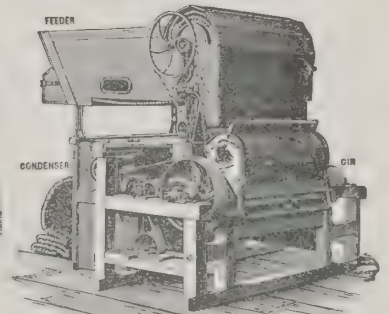
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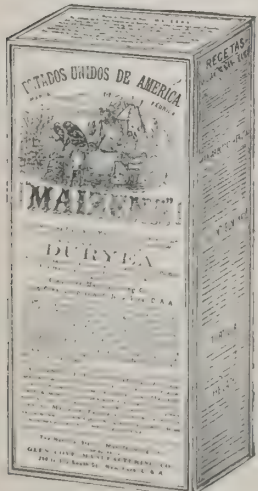
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## ELECTRICAL NEWS.

### From New York to Philadelphia in 36 Minutes.

HIGH-speed electric railway projects have been mooted from time to time and several interesting plans have been worked out. The first of the kind to attract general attention was one by Mr. O. T. Crosby, who read an exhaustive paper on the subject before the American Institute of Electrical Engineers in 1891. Later Mr. Frank J. Sprague, before the same society, in his inaugural address in 1892, took as his problem the electrical connection of the cities of New York and Philadelphia. In this project Mr. Sprague adopted as a basis for calculation a speed of 60 miles per hour between the two terminal points. The discussion of a project to accomplish the same distance in 36 minutes, or at an average speed of 141 2-3 miles per hour, forms the subject of a highly interesting essay by Messrs. Charles H. Davis and F. Stuart Williamson in the *Engineering Magazine* for October. In the portion of the essay which has thus far appeared the authors confine themselves to the discussion of the engineering problems, reserving for a later chapter the calculation of the cost of such an enterprise. It goes without saying that a road operated at such high speed must have no grade crossings, and that a rigid roadbed alone would be permissible. Coming down to details, the authors advocate the adoption of a rail 9 to 12 inches deep, weighing about 250 pounds to the yard, each rail being 60 feet long, and resting on braced steel chairs, with metal ties laid 2 feet on centres and carrying four rails. To reduce oscillation, one rail could be slightly elevated the entire length of the line, which would reduce the train resistance, as well as conduce to the comfort of the passengers. Very few curves, the sharpest having a four-mile radius, would permit of a material reduction in train resistance.

As regards the electric details, the third rail is considered the only feasible method of contact. This rail is to be placed close beside the car, elevated about 2 feet above the rails, and supported on ties as permanently and substantially as the other rails. The same structure carrying the third rails would also carry the feeders, while the high tension transmission lines would be placed on poles alongside the track. The authors anticipate no great difficulty in gathering the current by means of contact shoes, even at that high speed. The speed adopted naturally makes the question of train signalling of the highest importance, and in some respects the most difficult to solve. One can well imagine that on a road operating at 170 miles an hour maximum, or at the rate of 2,853 miles per minute, a signal system must be perfection itself, almost divinely perfect in its functions. It would take us too far to go into the details which have been worked out tentatively, though very neatly, by the authors. Suffice it to say that the section upon which a train is running and the one immediately ahead always have current, while the two sections following a train are always dead; there are also three danger signals behind every train. The interlocking signals would also be connected to the conductors, so that they would be deprived of current should the motorman be neglectful of his duty. They would also include devices for automatically applying the brakes. As to the constructive details of feeders and ground returns, they would follow existing practice.

Coming to the number and location of power stations, Messrs. Davis and Williamson assume the necessity of five such stations, a number which is somewhat in excess of the estimates of others who have considered the project. Two of these stations would be  $6\frac{1}{2}$  miles from each terminal or point of maximum acceleration, while the others would be spaced 18 miles apart. The passenger cars—there would, of course, be no freight handled on such a road—would be designed to rest on six-wheel trucks, with wheels 7 feet in diameter. They would have a seating capacity for 140 passengers, and such a car, it is estimated, could be brought to a stop within 9,910 feet on a level track. As to the actual train resistance which would be encountered, the authors conclude that the existing formulas are not sufficiently reliable for safe application to the present case, but they are of the opinion that it would be much less than many engineers now believe. To effect the necessary acceleration at starting they calculate will require 1,450 horse power per car, and it would require six minutes to attain full speed on a level! These are most interesting figures. Indeed, the essay is worked out in excellent detail, and we are somewhat curious to know how the financial side of the problem will show up.—*Electrical Engineer*.

### Electric Launches.

DURING the last season the electric launch has steadily grown in favor as a passenger carrier at pleasure resorts and in connection with summer hotels. They are to be found everywhere distributed over the country, from Portland, Me., to Tampa, Fla., and from Boston to Denver. The most popular type has been a 36-foot launch, with large seating space protected by a light roof, adjustable side-curtains, etc.

Because of the many advantages of electric launches and their popularity as passenger carriers, the electric street railway companies of the country are steadily introducing them in such service at the terminals of their trolley lines, especially at the parks and pleasure resorts operated by the management of these railway companies. In the development of these pleasure resorts the attractiveness of electric navigation has made electric launches a paying investment. Each boat is usually fitted with a power equipment for a continuous run of 6 to 7 hours, which, including landing stops, is equivalent to a day's work of 10 or 12 hours.

The charging current for the batteries is supplied direct from the trolley lines, with a rheostat or resistance coil to regulate the amount, but sometimes the high potential of 500 volts is reduced to the more convenient 110 volts by

the introduction of a motor governor, thereby preventing the loss in the resistance coil.

A New York company has even gone so far as to rebuild some of the accepted type of launches by removing the side seats from the after part of the boat and furnishing this space with cane chairs, a large divan and cane table. This feature improves the earning capacity very considerably, as the large boat becomes desirable for charter to small parties, who can be sociably seated together. When the maximum capacity of these large boats is desired, the chairs are removed and side benches are adjusted to accommodate the large number of passengers.

The gain in space over ordinary steam launches is wholly due to the use of electric motive power, and to putting motor and batteries entirely beneath the flooring, adding at the same time to the stability and cleanliness of the craft. This disposition of the motive power, moreover leaves all the space under both decks for storage purposes and supplies, luncheon hampers, clothes, etc., may be put out of sight when a day's trip is being taken. Under the forward deck of some boats has been built a refrigerator, with double doors opening into the boat through the bulkhead under the steering wheel, and the refrigerator is supplied with ice through the hatch of the deck. For evening trips the awning and side curtains are all removed, and several incandescent lamps fed from the boat batteries are strung from stem to stern.

Such a boat has been in commission all this Summer on the Hudson River, in the hands of a party of gentlemen, the owners, who may often have been seen cruising about in it off Scarborough. They have found its operation so simple and easy as to render wholly unnecessary the services of a boatman. For charging current they take the boat to the river dock of the Sing Sing Electric Company, about two miles off, and connect the batteries to wires from the exciter of a large alternating current dynamo there.

### Electrical Exports.

IN little more than half a year the value of the exports of electrical apparatus from the United States has amounted to more than \$2,000,000, which represents an increase of about \$500,000 over the figures for the corresponding period of last year. This increase, while noteworthy, is likely to be small in comparison with the increase which will be seen before another year has elapsed, as the demand for American electrical supplies is apparently growing stronger than ever.

As a straw to show the strength of the movement for American electrical goods it may be said that a single company has recently made four contracts involving a total of \$750,000. Another company has received orders for a generator station at Paris with a capacity for 6,000 lights, for motors with about 3,000 horse power for French tramways, and about 10,000-horse power for German tramways. Still another company has received an order for nearly 50 electric elevators for a London concern. Still another company has secured a single contract for an electric lighting plant in London at a figure of more than \$350,000. One Western firm took contracts for \$500,000 worth of machinery for electrical purposes during the past month, and another firm had orders for more than \$100,000 worth.

These signs of the times are naturally encouraging to Americans, and as most of the devices which are employed are patented, there is no reason to believe that European manufacturers are likely to compete successfully with the American manufacturers in the near future. European communities have been strangely conservative in the matter of adopting modern electrical appliances, but the economy and the convenience of such appliances are being better realized by the people of Europe, and the consequence is that many electrical enterprises are being organized in the United Kingdom and on the Continent.

### A New Call Box.

A COMBINATION telegraph and telephone call box for messenger service has just been brought out. When the receiver is removed from the hook the number of the box desiring service is automatically signalled to and registered at the central. The telephone is then used to communicate the wants of the subscriber, and this obviates sending a messenger to the calling party to find out what is wanted, as is the case in the old systems. The instrument is equipped with automatic ground connections, permitting of its operation under all conditions of wire trouble, such as short circuits, broken wire, permanent or intermittent ground escape. Each box is provided with two push buttons, enabling the subscriber to establish a ground on either side of his instrument, and at the same time to open the incoming wire at the binding post on the side of the box grounded. By this arrangement he can establish a complete circuit from his box over either or both wires leading to central, and renders it possible for him to both signal his location and talk to the office under almost any circumstances. A non-listening attachment is employed, whereby the central is at once notified of the number of any would-be eavesdropper, thus insuring absolute privacy in conversation.

AFTER a three months' visit to the United States and Canada Lord and Lady Kelvin left for home by the Campania. Lord Kelvin was greatly pleased with his American visit, stating that he had made notes enough of new ideas to keep him thinking all the rest of his life, and expressed quite an interest in the wonderful development of electric traction. Before sailing, Lord Kelvin made two visits to Tesla's laboratory in New York City, where some new scientific results were shown to him. Lord Kelvin is respected and loved by every electrical and scientific worker in the United States, and all wished him a pleasant return voyage and many years of continued usefulness at Glasgow University.

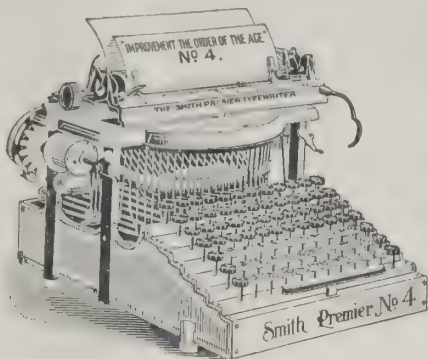


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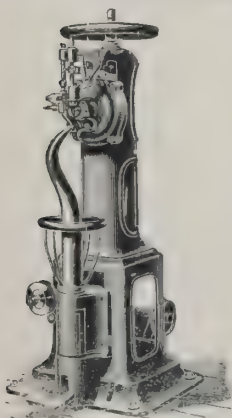
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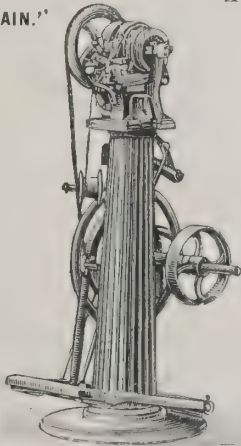
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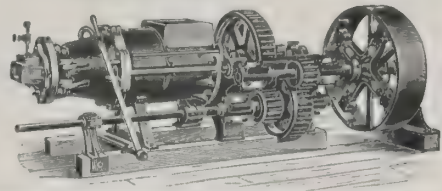
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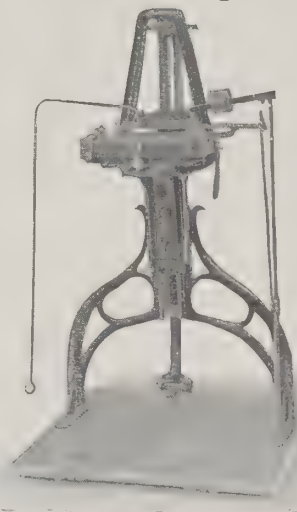
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which contains prices, discounts, etc., and solicit your correspondence for infor-  
mation you want on Metal Cornices, Building Fronts, Building Trimmings,  
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thoroughly, promptly, economically and intelligently.

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OUR advice to dealers is to handle Bicycles that are mechanically correct in design—those that have all up-to-date features—no fads, but practical, new improvements that benefit both wheel and rider. Such are.....

**FRAME.**—Best quality of weldless steel tubing is used. Main frame, 1 1/4-inch; head, 1 3/4-inch; lower rear stays, 1/2-inch, D shape, tapered to 3/8-inch; upper rear stays, 3/4-inch.

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**BEARINGS.**—Disc adjusting, made from best tool steel, scientifically tempered and carefully ground to remove any roughness caused by tempering.

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**OIL CUPS** are provided, which convey the oil direct to the bearings.

**HUBS AND CRANK-HANGER.**—Barrel pattern.

**WHEEL BASE,** 43 1/2 inches.

**WIDTH OF TREAD,** 5 1/4 inches.

**CRANKS AND SHAFT.**—Two-piece, joined in center.

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**PEDALS** are made rat-trap, so constructed that rubbers can be attached.

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We also make **HIGH-GRADE TANDEM**s and **JUVENILE WHEELS.**

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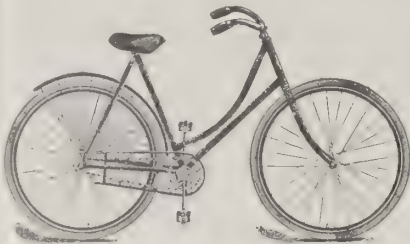
IMPERIAL MODELS, Nos. 38 and 39, - \$75 each. IMPERIAL JUVENILE MODELS, 5 and 6, - \$40 each.  
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Floor space occupies five and one-half acres. Capital invested in the manufacture of Bicycles, 800,000 dollars. Business established in 1869.

**Special Discount to Reliable Dealers.**

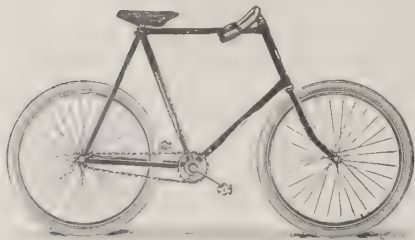
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We build bicycles of the finest quality only and have nothing to offer either in cheap or medium grade wheels. Our discount for export is 30 per cent., and we deliver machines properly boxed f. o. b. New York. Order through your commission house and send copy of order direct to us.

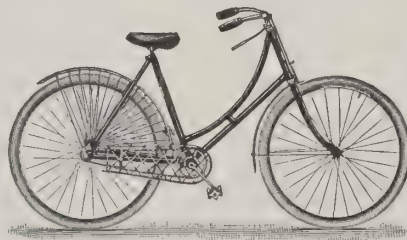


**TRIBUNE MODEL 27.**

Price \$100. Weight 23 1/2 lbs.

This is our standard men's wheel and is suitable for all kinds of road use. It is built in three heights of frames, 22 1/2, 24 or 26 1/2. The wheels are 28 inches diameter; 26 inches will be furnished if preferred. Gear, 68; options, 60, 63, 72, 73 or 80; cranks, 6 1/2 inches, 7 inches if preferred. If not otherwise specified, all machines will be fitted with Hartford or Morgan & Wright tires. All wheels are supplied with tool bag, tools and repair kit. Regular finish, black enamel, nickel trimmings. If a lighter wheel than the above is desired, order should specify Model 21, which will weigh with light road equipment about 20 1/2 lbs.

## Tribune Bicycles.



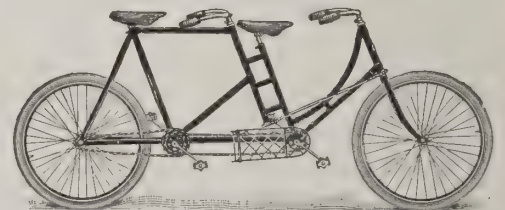
**TRIBUNE MODEL 24. Price \$100.**

Our ladies' wheels are built in three heights of frames, 20 1/2, 22 1/2 or 24 inches. 20 1/2 inches is standard and will be shipped if not otherwise specified. Wheels, 28 inches, can be furnished, with 26 if preferred. Regular gear, 63; options, 56, 60, 68 or 72; cranks, 6 inches throw. The weight is about 24 lbs.

The Celebrated  
Cycloidal  
Sprocket.



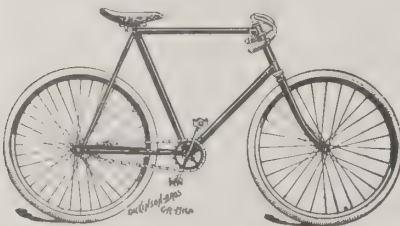
Used on  
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**TRIBUNE MODEL 23.**

Price \$150. Weight 44 lbs.

Our tandems are also built with double diamond frame for use of men riders. Wheels are 28 inches; height of frame, 24 inches; ladies' forward frame, 20 1/2 inches. Gear, 68; can fit with 72, 76 or 80, if desired.



Halladay Roadster, \$100. Discount, 45 per cent.



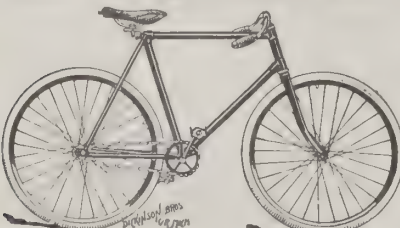
Lady Halladay, \$100. Discount, 45 per cent.



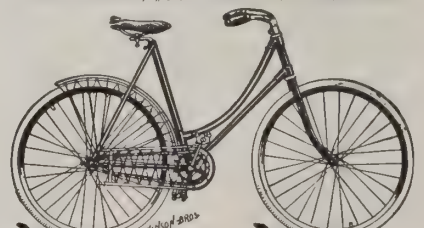
Lady Aetna, \$75. Discount, 50-55 per cent.



Aetna Roadster, \$75. Discount, 50-55 per cent.



26-inch Boys' Aetna, \$50. Discount, 40 per cent.



26-inch Girls' Aetna, \$50. Discount, 40 per cent.



24-inch Girls' Aetna, \$40. Discount, 35 per cent.



24-inch Boys' Aetna, \$40. Discount, 35 per cent.

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## Halladay AND Aetna Bicycles

Strictly of the Highest Grade.  
Absolutely Guaranteed.

Prices quoted with discounts are our BEST and cannot be beat for quality offered. Can refer to largest dealers in America. Complete line for reliable service. Orders accepted through reliable commission houses. Mail exact copy of order direct to us. Direct orders must be accompanied by Draft on New York or San Francisco. All goods carefully boxed for ocean shipment, F. O. B. New York; or delivered San Francisco or New Orleans, \$1.00 net extra per machine. Send for Art Catalogue mailed free.





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TO THE FOREIGN TRADE IN  
CYCLES AND SUPPLIES.

### The New Chainless Wheel.

THE long-looked for American chainless wheel has come at last, having made its appearance in the salesrooms of the Pope Manufacturing Company a few weeks ago. It has been much talked of for nearly a year, but the makers cleverly prevented any reliable description of it from becoming public. It must have been a difficult thing to do, and why they should have taken any trouble in the matter is only for them to say. The latest model resembles practically the old American League wheel which was marketed here four years ago.

An indication of the great interest felt in the wheel was shown in the fact that 10,811 persons crowded the Warren street warerooms in New York the first day that the bicycle was placed upon exhibition, and about as many more on the succeeding day.

The wheels, the frame, the saddle, the handle bars and the pedals are identical with those used for this year's chain bicycles. The chain, of course, is gone, and its disappearance involves a slight rearrangement of the tube running on the right hand side of the frame from the crank hanger to the rear bearing. The new wheel shows a semi-circular piece of tubing where this tube connects with the rear fork, a latch arrangement shutting in the rear axle and some bulbous coverings for the cog wheels. The sprocket wheel on the crank axle has also disappeared from sight, but behind a shining plate covering the working parts is a gear wheel of about the same size as the large sprocket wheel on the older type of machine. When the smaller details of the machine are considered several important changes will be found. One is in the cranks. One crank is made as part of the crank axle, while the one on the left side is made as a separate piece and secured to the axle by a cotter pin. Another change not apparent to the eye, but which is considered to have been forced by the need of greater stiffness in the frame, is that the two tubes forming the rear forks are of thicker metal, and their upper ends, under the saddle, are built fast to the frame by forgings and brazing, instead of being merely bolted on. In some other parts the frame has been made slightly heavier also, and these changes, with the addition of the weight in the gears, their covers and connections above that of the sprockets and chain, make the new wheel about a pound heavier than the standard wheel of this year.

The working parts consist of four gear wheels, a steel rod or shaft, divided by a sort of wedge-joint near one end, to allow of trifling variations, and two ball bearing journals in addition to those on the older chain wheels. The first of these gears is the main driving wheel upon the crank shaft, and occupies the place of the large sprocket wheel. The crank shaft runs as of old in two ball bearings. The second gear of the series is a small bevel at the end of the jointed shaft, and is fitted to the driving gear. The third is secured to the other end of this shaft. Back of each of these gears at either end of the tube are the two new ball bearings. The fourth gear wheel is secured to the righthand end of the hub of the rear wheel, and just like the smaller sprocket which it replaces, still has its two ball bearings upon its axle. The semi circular list of tubing already mentioned, bends around the line of the fourth gear wheel, and passes back of the rear bearing of the shaft, which carries the intermediary cogs, thus leaving no direct means of securing the axle of the rear wheel on that side to the forks, and to provide for this a latch is made, which has a socket for the rear axle at its centre. This is bolted to the ends of the semi circular tube. After all the working parts are in place and adjusted a plate which fits over the large gear wheel is put into place in the face of a cup-shaped forging which covers the back of that wheel, and the connection with the second cog wheel; two odd-shaped forgings, are bolted into place, so that they cover the two rear gears, and the working parts are out of sight and secure from dust. Where the moving parts meet these shields felt washers are provided to exclude dust, and the covers are said to be so tight that they will retain oil, and all the working parts may be kept in lubricating oil.

That the machine is slightly no one will deny. That it has been so arranged as to overcome all the drawbacks which have made the bevel-gear machine a failure heretofore must be taken upon faith; but the confidence of its makers in it, and that of the ten or twelve other makers of high reputation who are getting ready to compete for the trade in chainless bicycles, is proved by the extensive scale upon which they will all go into the manufacture. Even to the expert

mechanic the differences between the new wheel and the earlier forms from which it has been developed are small and appear insignificant, but the makers declare that there is hardly a single feature in either the making or arrangement of the parts which has not been adopted as the result of some good reason developed by a long series of experiments and to meet some practical defect which had been found. In theory there is no difference mechanically between the new wheel and the old one. The chain and sprocket form but a train of cog wheels, with one wheel made flexible. In practice this very flexibility has been the reason why its has been successful in the hands of the general public, who do not know, and perhaps do not wish to know, anything about the expert care of machinery. If the sprockets and chain were once cut to fit each other they rolled together without any sliding friction, and it made little difference whether the chain was slack or tight so long as it was clean. With fixed gearing this is not true. To secure a true rolling together of the gears it is absolutely necessary that the wheels shall remain in exact relative positions, and the formation of properly shaped teeth for bevel gears has heretofore been considered mechanically impossible. It is claimed, however, that machines have at last been made which will form these teeth properly. But it may be confidently declared that the users of the new wheels will find that they are extremely delicate pieces of machinery which if tampered with by unskillful persons, even in tightening up the ball bearings, may be put out of adjustment enough to set the cogs grinding together instead of rolling. A number of large manufacturers of wheels who might naturally have been expected to go into the making of the new wheel have, for reasons which they consider good, decided to wait at least a year and watch for developments.

If the new wheel proves a success the credit will be due to the Pope Manufacturing Company. What it is this company has made it, and all the bevel-gear wheels which are on the market or are to be put upon the market, so far as is known, will be made under the series of patents which the company owns. Its work in developing the new wheel began about two and one half years ago. Taking the old League chainless wheel of five years ago for a starter its managers began experimenting and, as fast as defects were found, they looked for means of remedying them. In the course of this work they found that one inventor after another had already been over one part or another of the field and secured patents, either upon some essential arrangement of parts or desirable designs. These patents were all purchased and when the other manufacturers of wheels began to think of making a chainless bevel-gear wheel they became satisfied that although they might avoid some of these patents they could not avoid them all. The result is that each has become a licensee under these patents.

There is one feature of the new wheel in which it will differ from the other styles. In chain wheels the prices have been broken, and there is no prospect of any successful attempt to reestablish them or to make them uniform. There are between 200 and 300 makers, all of whom make wheels which are at least satisfactory to buyers, if they are not all high grade, and competition will keep the prices down.

### New Automatic Cycle Brake.

NEXT to the chainless wheel the brake problem is of the most absorbing interest among wheelmen at the present time. Cycle parts have reached such a degree of perfection that the old-style brake has become objectionable from its unsightliness and its weight. For a long time a brake light in weight and hidden from view has been largely sought for and seems to have been found at last in the invisible automatic brake. One of the chief virtues of the new attachment is that no effort on the part of the rider is required either to apply or release it.

It is claimed that it gives complete control of the bicycle for slackening speed or for sudden stops in case of danger. The new brake is applied to the rear hub between sprocket and fork and consists of two parts, an expansion ring and internal friction-faced drum. The rider has merely to back pedal and the parts are brought into action and by friction retard the action of the rear wheel. The new brake serves to increase the power of back pedalling many times and the resistance may either be applied gradually or suddenly, as required.



### American Models, 1898.

THE American models for 1898 are nearly all equipped with a brake or are provided with a brake attachment, a state of affairs which indicates that increased interest is manifested in the use of brakes in this country. For several years past a brake on a wheel has been the exception rather than the rule, and many makers have built their wheels without a thought of a brake, providing no means for its attachment. There have been many riders, however, among them some of the oldest in the sport, who have always contended that the brake was a necessity. The number of accidents constantly happening, many of them being fatal ones, and many of which could have been easily avoided had the luckless rider had a brake which he could control, have served to confirm this opinion to such an extent that the brake question is once more of paramount interest to the bicycle makers.

The improvement of the brake, too, has been as marked as that of the bicycle itself, and the brakes being offered for the 1898 trade include several automatic arrangements of more than ordinary value.

A description of one such brake is given in another column. It is a portion of the machine rather than an attachment and is easily and quickly controlled. From present indications a large proportion of the wheels built the coming year are to be fitted with a braking device of some kind.

### Sprocket Testing.

SOME experiments were recently conducted to determine the comparative efficiency of sprockets of different sizes. To carry out the experiments the bicycle was inverted and the frame securely attached to the floor. A thin steel band had one end attached to the tire and the other end carrying a weight which was raised by the band being wound upon the tire, a second weight being hung from a scale pan attached to the pedal, whence the efficiency of the portion of the mechanism transmitting the power could be calculated.

A long series of readings were taken with the same large sprocket with seven, eight and nine toothed sprockets on the rear and with pedal weights varying from two pounds to fifty pounds. The average efficiencies in each case were as follows: Seven-tooth, 89.9; eight tooth, 91.5; nine-tooth, 93.4.

This shows the eight-tooth to have 98.9 per cent. of the efficiency of the nine-tooth sprocket, and the seven-tooth to have 96 per cent. of the efficiency of the nine tooth sprocket, other conditions being equal. The result proves that there is less chain pressure upon the teeth of the larger wheels, and hence less wear.—*The Wheel*.

### England's Bicycle Trade.

CONSUL BARKER, at Birmingham, England, in his annual report to the State Department says that the one marked development in that district during the year has been the cycle trade. It has been so great that there has been a great overproduction. The trade with the United States has not been greatly affected, because no complete bicycles have been sent to the United States since 1894.

The British foreign trade in bicycles amounted in 1895 to \$6,747,012; in 1896 to \$9,056,420, and in 1897 (estimated) \$7,877,275. So many men have been drawn into bicycle making that other branches have been injured. An increase of 10 per cent. in the wages of skilled labor has resulted, but a decline is expected for various reasons, including the introduction and use of the best American machinery. In the last two fiscal years the exports from the United States to the United Kingdom of cycles and parts of cycles were: For 1896, \$613,592; for 1897, \$2,375,675.

### New Air Pumps for Bicycles.

AN air pump with the tube extending upward from the bicycle fork through the head tube has been utilized as an air-pump cylinder by William Turner, of this city. The patentee's idea is that riders are looking for a pump which is a part of the bicycle. Last Fall a South Providence manufacturer converted the tube supporting the saddle into an air pump. Now another inventor puts a pump inside the head. In the latter case a hole is drilled through the handle bar for the pump rod, on the upper end of which is secured a handle, and the cup piston is placed on the lower end. The lower side of the fork crown is screw threaded to receive a cap with a bent tube to which a flexible tube is secured. The pump handle rests on the handle bar. This combination was patented recently.

### New Cycle Attachment.

A WILLIAMSTOWN (N. Y.) inventor has brought out an attachment for bicycles which he thinks will render them of great service in military manoeuvres. The attachment consists of two steel supports that drop to the ground when a brake like appliance on the handle-bar is lightly touched. Upon these supports the bicycle rests, and the rider can come to a standstill and use his hands for any purpose without dismounting. When not in use the supports are folded up against the front forks of the machine. The inventor claims that by the use of his attachment bodies of military wheelmen can come to a sudden halt and fire on the enemy and reload their rifles without dismounting.

—There is a scheme on foot at Toronto to bring electricity from Niagara Falls to a number of cities in Ontario, over 100 miles from the power house at the Falls. The company has undertaken to supply forty or fifty municipalities with power at the rate of  $\frac{1}{4}$  cent per horse power.

### Large Electrical Exports.

THE American manufacturer of electrical appliances without exaggeration stands unchallenged in the first place. Particularly is this so in the case of railway plants, though this is largely a condition resulting from natural causes, for, while the English and German and French have been theorizing, they have been content to stand by and watch the American manufacturer spend his money putting his own theories into practical operation. This money would naturally be called wasted if some of the machines and appliances on which it was spent were depended upon for present day operation. But it can hardly be denominated as wasted when it is remembered that virtually every machine and every appliance on which the large companies have spent their money has been the forerunner of something more perfect and more practical, and that in perfecting these improvements the American manufacturers have supplied themselves with perfect machinery which the foreign manufacturers will take a considerable time in duplicating. The demand for electric transportation has, moreover, been much greater for suburban travel in this country than in the older countries, and this has furnished another incentive for practical rather than theoretical work by American manufacturers.

In addition to the transportation interests there are three distinct lines of export. First, mining appliances, which include pumps, locomotives, hoists, blowers, etc.; second, appliances for the transmission of power, including the alternating current systems, dynamos, transformers for producing high or low voltage, etc., and third, telephone and electric light appliances.

Thus far the electric railway exports have been largely to the United Kingdom and Continental Europe. Buenos Ayres being so far as could be learned at the offices of the electric railroads yesterday the only South American city in which an electric railway is in actual operation, though plants are proposed in Caracas, Lima and Valparaiso. The high cost of coal with which to produce steam to generate the electricity is one of the chief obstacles to the building of electric railways in South America, and to those countries the exports are at present largely appliances for transmission of power from the water courses. The mining machinery, of course, goes to the mining countries, while the exports otherwise are more or less general in distribution.

The statistics given by the Custom House authorities do not give an adequate idea of the value of the export trade, owing largely to defective classification. The only heading under which comparisons can be made with exports during recent years is that of "Instruments and apparatus for scientific purposes, including telegraph, telephone and other electric" supplies. These figures show total exports valued at \$324,600 for July (the latest detailed statement issued by the Bureau of Statistics), which, however, indicates an increase of \$143,144 from the July, 1896, record; while for the seven months ending with July the value of the exports reached a total of \$2,043,802, representing an increase of \$480,909 over the corresponding period of last year. Following are the figures for the seven months, showing the countries to which the supplies were shipped:

United Kingdom.....	\$264,096
France.....	173,835
Germany.....	186,325
Other European countries.....	210,185
British North America.....	200,934
Central America and British Honduras.....	63,606
Mexico.....	190,155
West Indies and Bermuda.....	77,727
Argentina.....	107,409
Brazil.....	81,954
Other South American countries.....	97,550
China.....	6,235
Japan.....	101,924
British Australia.....	48,591
Other Asiatic countries and Oceania.....	50,219
Africa.....	177,943
Other countries.....	114
Total.....	\$2,043,902

Among the items not included in the foregoing table is the important item of electrical machinery. Prior to July, 1897, the Bureau of Statistics did not state these articles separately; they have now decided to do so. For the month of July the exports in this direction amounted in value to \$64,839.

Aside from the increased exports of electric supplies there has been a corresponding increase in the export demand for boilers and steam engines to operate them. One company, for instance, during the month of September closed contracts for foreign orders aggregating \$500,000, a very considerable part of which represented orders in connection with electrical machinery. Six engines of 1 500 horse power each were ordered for the Central London Underground Railway. Six were ordered for the Dublin tramways, to furnish, 1,000 horse power each, to propel electric cars over the old tramways. Three engines of 1,000 horse power were ordered by the Barcelona authorities to work electric cars on their tramways. Two duplicate engines will be sent to Madrid, Spain, for the tramways there. From Sydney, New South Wales, has come an order for four engines of 1,500 horse-power each for the Sydney tramways. Another firm has booked orders for upwards of \$100,000. These contracts, they say, are for engines for Japan, Australia, South Africa, the Argentine Republic and Mexico, all for use in connection with electrical machinery.

—American typewriters everywhere command the market. There are no acceptable writing machines made outside of the United States. This is forcibly illustrated by the awards at the recent International Exposition at Brussels. Several American typewriters received gold medals and one well-known machine secured a special diploma of honor, the highest possible award.





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furnish the standard time for all countries.

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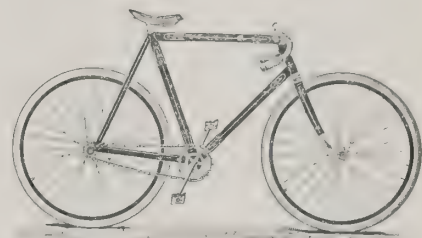
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"OVERLAND" Cycles, all sizes, all patterns, \$40.00 to \$75.00.

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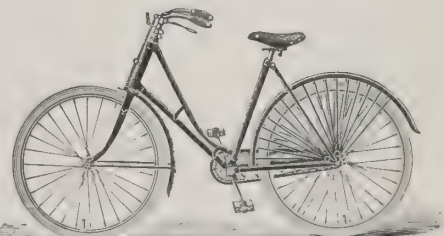
The felt pads are supported on a laced framework of tough but elastic leather thongs.



ENVOY.

None but expert mechanics employed in their construction.  
Absolutely high grade in every detail.  
Best wheels ever offered at anything like the price.  
Write for catalogue and full information as to terms, etc.

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We can interest cash buyers in  
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Two Models: - \$75 and \$100.

Discount, 50 per cent. F. O. B. New York. Orders accepted through reliable Commission Houses. Always mail copy of order direct to us. Direct order must be accompanied by cash.

THE SHERMAN CYCLE CO.  
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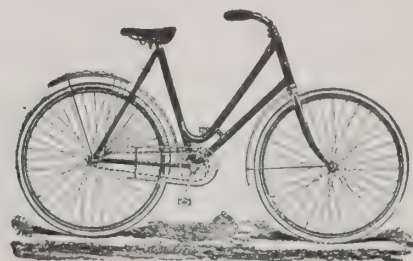
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Write for Terms.

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### An Electric Car Controller.

THE *Electrical Engineer* gives the following description of a new electric car controller recently patented by J. C. Henry, of Denver: The controller consists of several well known and advantageous methods of controlling motors and cars and uniting them in a single instrument capable of operation by the same handle. In addition to controlling the supply of current to the motors in an economical way and providing an ideal electric car braking system, the energy of momentum when coming to a stop, or that of gravity when descending grades, is recoupled and turned back into the line to assist the station dynamo.

The field magnets of the motors are connected in series and are independent of the armature circuits. Their strength is varied over a wide range by a rheostat in the shunt or separately excited circuit, while the armatures are manipulated from parallel to series in the well known way. When braking the cars those available means of increasing the motors' voltage above that on the line become exhausted, which they would in ordinary street railway practice at a speed of about five miles per hour, the motors are then smoothly brought to a stand by short circuiting their armatures under the variable magnetic field. The controller is so arranged that a forward movement of its handle smoothly decreases the voltage of the motors, and consequently increases the amount of current to the armatures, while a backward movement increases the motors' voltage, so that they are not only capable of resisting the passage of current from the line, but aid the stationary generators as long as the motors are driven forward by momentum or gravity.

In using separately excited or shunt-wound motors as proposed, the arc formed when the trolley leaves the wire, or when the armature circuit is broken, is very small when compared with that of series motors—probably not over one-fifth the length. This greatly simplifies the construction of the controller, as it avoids the necessity of supplementary arc breakers. When higher than the ordinary voltages are used the switching is all done in a closed receptacle containing carbonic acid, or some other easily generated gas, incapable of supporting combustion. If still higher voltages are to be dealt with it is proposed to emit a jet of the gas under heavy pressure against the arc, and thus quickly obliterate it by mechanical displacement and by the intense heat-absorbing force of the gas. With such a system of breaking it is obvious that there would be no wear on the wheels or brake shoes, and such expensive and disagreeable things as flat wheels would not exist.

### Pneumatic Tubes in New York.

A PNEUMATIC-tube system has now been in operation at the General Post Office, New York, for nearly two months. It passed successfully all experimental stages and was placed in regular service by the Government authorities on October 11th last, since which date it has continued to do duty smoothly, easily and rapidly. This is only a part of a larger system that is not yet completed. The finished portion runs between the General Post Office and the substation at the Produce Exchange.

No doubt was entertained from the first that the pneumatic tubes would save a great deal of time. This was admitted in advance, for it had been demonstrated in Philadelphia. But in that city the tubes are only six inches in diameter, while those in this city are eight inches in diameter. The increased carrying capacity thus gained greatly enhances the value of the system. In Europe the same system is in use in some cities, but three-inch tubes are the largest that are there considered practicable.

The Government authorities express themselves as highly pleased with the working of the new system thus far. The distance from the General Post Office to the Produce Exchange is covered in less than one and a half minutes. Moreover, they expect great things from it in future, as an aid to the rapid transmission of mails, not only within the limits of the city itself, but throughout the country. No city is regarded as so distant from New York that it will not be a gainer by the time saved in the transmission of mails by the pneumatic-tube system. Second Assistant Postmaster General Shallenberger says that the Government expects to be able to save so much time by this system in the dispatch of mails to distant cities that they will get their mails from twelve to thirty-six hours sooner than heretofore.

But the promoters of the pneumatic-tube system claim other things for their system beyond the rapid transmission of mails. They claim that all sorts of merchandise can be sent safely and quickly through the tubes, and their claim has been well borne out by the trials of the pneumatic tubes. On the day of the formal opening of the line at the General Post Office various things were safely sent through the eight-inch tubes, the assortment ranging from a live and full-sized cat to a magnum of champagne. Many possibilities in the way of usefulness are thus presented. The next portion of the system to be opened for use will be the line from the Grand Central Station to the General Post Office. Work on this section is already far advanced, and it is expected that it will be completed by the last of November, at latest.

THE *Hardwareman* of London in referring to Mr. Thos. Clarke, the London representative of an American wagon company, who last month came to New York to attend the Carriage Builders' National Association of the U. S. A., has this to say: "Mr. Clarke is the only member of the association residing in Europe, and the favor which American vehicles are acquiring in Great Britain and on the Continent is very largely due to his efforts. Many of the best patterns now on our market have been made from Mr. Clarke's suggestions for adapting the special features of American vehicles to English conditions and English tastes. We wish him a pleasant voyage and a safe return."

### American Exhibit at Paris, 1900.

MAJOR MOSES P. HANDY, Special Commissioner from the United States to the Paris Exposition of 1900, returned recently and made a very gratifying report upon the result of his mission to Paris. He said:

"I succeeded beyond expectation in securing space. It is true that I was handicapped somewhat. The American Government, it should be remembered, accepted the invitation of France for an award of space one year after the invitation was originally extended. The European countries were a little quicker with their acceptances, so that when I arrived on the field it was to find eighteen commissioners there.

"Some of them had been surveying and prospecting for the full year almost, and naturally had arranged a great many things to their own liking. I succeeded finally in making up for a great deal of lost time and induced the French authorities to make certain allotments of space on the basis of the most favored nation. In this way America received altogether 200,000 square feet of space. That is pretty good, I take it, considering that the American representative started in after other commissioners had been one year at work.

"Indications are not lacking, even now, as to the outcome of the Exposition. I feel perfectly safe in making the prediction at this early date that the exhibition will eclipse anything of the kind in the past. Everybody seems greatly enthusiastic over it, not alone the French people, but the visitors as well. Of course, America will make a memorable and fitting display, and while it is true that additional space would have bettered our chance, still with the 200,000 square feet at our disposal I feel satisfied that no country will be better represented there in 1900. In the Exposition of 1889 we only had 113,000 square feet.

"There are so many representative American industries anxious to obtain privileges in connection with our award that I realize how utterly impossible it will be to satisfy the demands of all. We will do alike by everybody, though, and satisfy all as much as possible. I expect to make my official report some time next week."

### Foreign Compliments.

COMMENTING upon the heavy purchases recently made in this market, *The London Engineer*, one of the leading industrial magazines of Great Britain, says: "We are becoming more and more dependent upon American tool makers. Within the last few months we have gone to the United States to get elevators for the Central Railway of London, and now we are forced to go to the same side of the Atlantic for electric motors with which to equip them. Until our manufacturers take the trouble to teach their hands how to provide new machinery, we must continue to witness the humiliating spectacle of seeing our contracts awarded to Americans."

Still another tribute to our industrial enterprise comes from the *London Chronicle*, a sturdy exponent of British sentiment, from whose columns we quote as follows: "It is currently rumored that the London and Northwestern Railway is at present treating for the delivery of 100,000 steel rails, and with the low prices and cheap rates prevailing, there is no reason to discredit the rumor. Also, it is given out on good authority, that our manufacturers have lost the large rail contracts for Canadian main railways, to which we appeared to possess a prescriptive right, while recently an order for 4,000 tons of rails for this country was secured by an American firm, by reason of low price and promptness of delivery, the quality of course being secured by a rigid specification. Nor is it only in regard to steel rails that our manufacturers are letting the present and future slip out of their grasp."

### New Process for Tanning Leather.

THE *Sentinel* of Portsmouth, Ohio, states that Geo. Wurster of that town has discovered a new process for tanning leather that will revolutionize the business.

Instead of taking six months to tan a piece of leather, Mr. Wurster claims to be able to work a green hide up into the finest quality of leather in five days. The cost is less than half that by the old process. The chemicals used are not expensive, and the whole process is very simple. Mr. Wurster has been experimenting several months. He will keep the process secret. He has already applied to the Patent Office for a patent.

Some of the leather has been submitted to the shoe factories, and the Tremper factory has worked considerable of it up into heels. It is much tougher than leather tanned by the old process. The fibre is not injured in the process of tanning. All kinds of skins have been tried by Mr. Wurster, and all tan out in the same satisfactory manner. A pig skin is just as easy to tan and takes no more time than a calf skin. It takes two days to lime the skin, and the actual tanning process only requires three more days. Mr. Wurster has interested several of the shoe men of his town in his discovery, a company is now organizing to control the patent right of the new process and articles of incorporation will be applied for shortly.

ANDREW CARNEGIE has perfected the largest iron producing combination in the world by securing the lease of the Tilden mine. He will operate this big producer in connection with the Norrie and the group of mines which he owns in the Mesaba range. The series of operations whereby the Carnegie interests have come into control of the greatest group of iron ore producing properties in America constitute the most important movement that has taken place in the iron trade for years.



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Conforms by means of adjusting bar to the exact contour of the anatomy of the body. It is practically two natural moulds upon which the human form can rest. These moulds are responsive to every motion of the limb. A boon to both sexes.

**Price, \$4.00.**

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No. 14 A.

For an easy and comfortable Saddle, this beats any Saddle on the market. Handsomely padded and covered with the finest leather in either black or russet.

Strictly Hygienic.

**LIST PRICE, - \$4.00.**

Send for catalogue and jobbers' prices. Send us duplicate order when ordering through commission merchants.

**HARDEN SADDLE AND SPECIALTY CO., Toledo, Ohio, U. S. A.**

for  
Bicycles.



List Price,  
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The bottom of this seat is made of light material; the sides and back are of rattan, beautifully woven and mounted on a double steel wire spring clamped rigidly to handle bar post, with a movable foot rest.

The seat is covered with a nice cushion, making a very beautiful and easy riding seat for a child. See this seat and you will have no other.

## The Wheeler Reform Saddle.



Shaped to afford the rider a natural support and overcomes all saddle soreness.

Specially recommended for Ladies. Indorsed by eminent physicians. A practical saddle for all riders. Write for catalogue and be convinced. If your dealer cannot supply you, write

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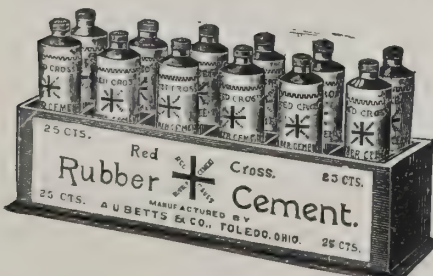
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**'97 Model Now Ready.**

Patee bicycles have a world-wide reputation because they are always "up to date" in every particular, and also because only the very best material is used in their construction.



They are built by the oldest and best-known high-grade bicycle men in America, and the '97 model embodies some new and special features that will fascinate wheelmen and dealers instantly.

The one-piece crank shaft and cranks, the thorough dust-proof device, the quality of tool steel in bearings, the manner of re-enforcing, the adjustable bar and manner of locking in the head are all new and special features used exclusively on the "Patee" (our own patents).

Do not contract for '97 without getting our catalogue and prices and seeing sample. It is unblushingly and emphatically the best bicycle in the world for the money, and is guaranteed equal to any bicycle in the world. American list, \$60.00. Liberal discount to dealers. Do not be afraid to write. We want your business and will take pleasure in telling you more about our wheel. Address

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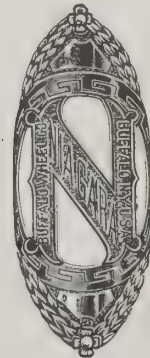
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### Tesla on Electric Railroading.

IN view of the many late improvements in electric traction systems in the United States, and the high degree of speed and general efficiency attained by experiments along some important railways, electric railroading is receiving much study and attention.

In an interview with a New York newspaper reporter respecting a projected enterprise of a new company, Nicola Tesla, the celebrated American electrician, gave his views on high speed railroading as follows:

"The projectors of the road to be operated by means of the alternating current, evidently realize what a vast undertaking they are entering into, as is indicated by their capitalization. First of all, it is not only practicable, but easy of perfection. The question of great speed will be greatly controlled by the quality of the track and the running gear on the cars. Properly constructed tracks, on level country, will permit a rate of speed as high as 150 miles an hour, and perhaps 200, as its stated by the president of the company, but it is certain that 100 miles an hour can be made with safety.

"So far as any personal discomfort is concerned, it is my impression that without curves and heavy grades such as are found on surface roads, the flight of a train travelling 100 miles an hour would not be any more unpleasant than one travelling 60. An air line road built eight feet above the ground, with no obstructions and perfected running gear and heavy tracks, would cover the distance between here and Chicago easily in nine hours, and mail and light freight could even travel at the 150-mile rate.

"The venture is a big one—large enough, I should say, for the Government to handle. It will revolutionize railroad travel and work great changes in commerce between cities wide apart.

"The popular impression that the speed is too great amounts to nothing. Balloonists have gone 150 miles an hour, and so far as a question of velocity is concerned, it depends upon the machinery and the excellence of the track. The human frame can stand the trip just as easily as at half that speed.

"If the General Electric Company has offered to sign a contract to equip the road I am satisfied that all the petty obstructions have been carefully investigated, and that the promoters mean business. Either the General Electric Company or the Westinghouse can supply the power if others will supply the capital. So far as the alternating current is concerned, it will supply the speed."

### Electric Machinery for Japan.

TO judge from the frequent orders lately received from Japan it would appear that that country is now fully awake to the advantages to be derived from the use of electrical machinery for lighting and power transmission. A large electric power transmission system will be shortly installed in a large car-building works at Nagaya, in Japan which will be the first plant of the kind ever erected in Asia.

Advices state that the Hankaku Railway Company, of Osaka, Japan, has just decided to equip its shops with an electric power transmission system. The order for motors has just been placed and includes some ten machines aggregating some 80 or 90 horse power. The motors will be of the inclosed ironclad type except a few of the smaller ones, which will be of the bipolar type. For driving these a multipolar 75 K. W. generator will be employed. No efforts are to be spared to make this a model installation, and it is intended to shortly make considerable additions to the plant.

An American representative in Kobe, Japan, has advised his company by recent mail that he expects soon to forward to New York a contract for electric power transmission equipment which will be a record breaker in its magnitude and which is to be employed in one of the largest manufacturing institutions in Japan.

### Trolley Systems for Europe.

THE three European cities of Dublin, Ireland, and Barcelona and Madrid, Spain, are to be equipped with trolley systems, a contract for the work having just been closed with the British Thomson-Houston Company, of London. All the electrical and steam apparatus on the Dublin order and all the electrical apparatus on the Barcelona and Madrid lines will be of American manufacture, the electrical apparatus being manufactured in Schenectady, N. Y., and the engines at Milwaukee. For Dublin, the contract includes all the steam boiler and engine, dynamo and motor equipment. The steam and electrical portion will amount to about 5,000 horse-power; the motor equipment sufficient for 150 cars. For Barcelona and Madrid, the contract for the electrical equipment only has been signed. It covers, however, 3,000 horse-power in dynamo and motor equipment for 140 cars.

### To Get Around Wrecks.

F. R. COATES, a railway roadmaster, has devised a new method for putting a switch track around a wreck in quick time. The secret is in the frogs. They connect the temporary crossover with the main tracks without cutting a rail or a tie or pulling a spike. They are mortised into the main tracks and when the wheels of the train which to cross over touch them the train is raised up above the level of the main tracks, and passes over as smoothly as though the rails were cut and an old fashioned switch inserted after many hours of hard labor by a hundred or more men.

If the right-hand track, for example, is blocked, trains may pass the wreck by being switched over to the left-hand track, and if a train wants to run in the opposite way on the left-hand track the frogs of the crossover may be taken out in a moment to let it pass and put back in an equally short period.

### New Electric Grain Elevator.

NATURALLY the safe and proper storage of grain is the most important consideration to elevator owners. To construct an elevator that would obviate the dangers of heating or fire has been the ambition of elevator builders up to the present day.

Early this year a company was formed in Buffalo called the Electric Grain Elevator Company which decided to build a plant to revolutionize the prevailing methods in that city. After a careful examination of all the conditions involved a contract was given to a construction company of Connersville, Ind., to draw plans and build a fireproof, air-tight storage house with a capacity of 1,000,000 bushels and this elevator is now approaching completion.

It is situated on the Buffalo Creek just above the Ohio street bridge in Buffalo and is built to receive grain from vessels and load it in canal boats or cars. There will be one stationary and one movable tower containing marine legs of about 15,000 bushels hourly capacity. The grain is carried to the storage tanks on a belt conveyor 40 inches wide. These tanks are air tight. While air is essential to the life and growth of vegetable matter in stored grain it induces fermentation and accumulates dust. And it has been demonstrated that grain can be kept in air-tight tanks for a greater length of time without danger from heating or "sweating" than in any other manner. These tanks are fitted with self-cleaning bottoms which discharge grain on belt conveyers that carry it back to the working house for shipment.

All the material used in the construction of this elevator is of a fireproof nature and consequently the insurance rate should be nominal, if indeed it be necessary to carry insurance at all.

### Some Increasing American Exports.

AMERICAN medicines are now wanted abroad owing to the reputation which they have won. Our quinine is now known all over the globe and so are other important preparations. The result is a general demand for American medicines in Africa, Australia and South America and our leading druggists feel the impetus. Even the paper-box manufacturers are now receiving the benefit of export demand, as neither Great Britain nor Europe can rival the neat and elegant boxes made in this city. This specialty, though it may seem small, has been increasing for many years, until it has reached an immense aggregate. American photographic supplies are also wanted abroad, and large shipments have been recently made.

Box shooks are another active feature in the export trade, and 40,000 boxes in this shape have just been ordered for the West Indies, while another shipment is made to Brazil. "Shooks" are material for boxes or barrels in compact shape which are put together at the plantations and come back filled with sugar and molasses. The grain trade still shows signs of life, and the Erie Canal transit alone during September showed an increase of flour over the same month last year and also an increase of more than 12,000,000 bushels of grain.

### High Kite Flying.

RECENTLY a very interesting experiment was made in high kite flying at Boston, from the Blue Hill Observatory, when the highest altitude ever reached by a kite was attained. The top kite reached a height of 10,016 feet above sea level, or 8,386 above the summit of the hill. The ascent began at noon, and the highest point was reached at 4.17 P. M., when seven Hargrave kites were held by nearly four miles of wire. An instrument recording temperature, humidity, and pressure was hung about 180 feet below the highest kite.

At the highest point reached the temperature was 38 degrees, while at the ground it was 63 degrees. At the height of 4,000 feet the humidity rose rapidly, then fell, and at the height of a mile it was quite low. At 7,000 feet the humidity rose to almost saturation, but at 8,000 feet it began to fall, and at the highest point it was extremely low. At the ground the humidity remained low during the entire ascent. Above 5,000 feet the wind was from the west, while at the ground there was a southerly wind. The instrument and kites were brought down at 6.40 P. M., having been more than a mile above the hills for over five hours.

### A New Innersole.

A BOSTONIAN has recently made application for a patent on an innersole. It is called The Washable Hair Innersole, and it is claimed that it will keep the feet warm and dry in Winter, and clean and cool in Summer. This innersole is constructed of cloth and horsehair—the hair being laid upon the cloth and stitched through and through with a sewing machine, the rows of stitching being worked close enough to hold the hair firmly to the cloth. When finished it is not to exceed an eighth of an inch in thickness, and is placed in the shoe with the hair-side next to the foot. Hair naturally has more or less spring to it, and I doubt if there is anything the equal of this innersole to give comfort to people who stand or walk extensively.

THERE is now going through one of the factories of a large New England shoe house a fair-sized order for goods to go to South Africa. It represents the first purchase of shoes ever made in the United States by the firm in question, which really has its headquarters in London. This house for several years has been a shipper of shoes, together with other merchandise, from England, and expects in the future to purchase quite extensively of American goods. This is one of the three South African houses which very recently have placed their initiatory orders with our American manufacturers.



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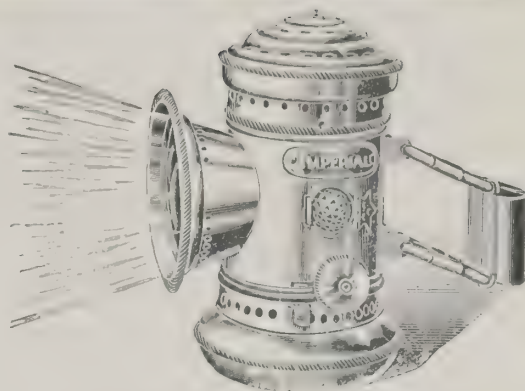
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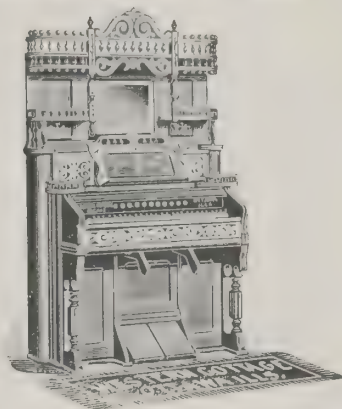


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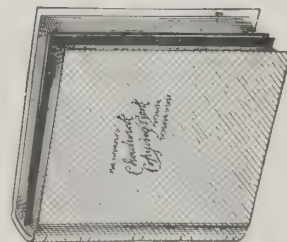
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Is most desirable for sheds and porches, also for barns, stables, outbuildings, etc., where "no smoking" is desired. This is an extra fine Lamp, made in three sizes, has no chimney, and no complication to make trouble of any sort. It has an improved burner and outside wick regulator; gives a very brilliant light that the strongest wind cannot quench—and, in general, it gives universal satisfaction. The list prices of the three sizes of this lamp are \$5.50, \$6.50 and \$8.50, and the export discount 40, 10 & 5 per cent.



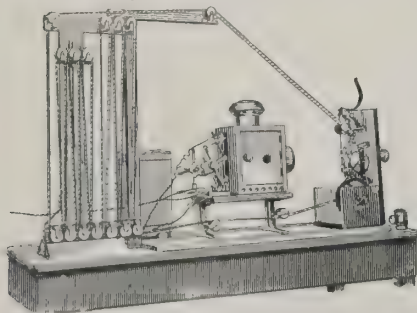
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Film Pictures, 50 ft. long, \$15 each; 150 ft. long, \$45 each. Send for catalogue of over 300 subjects. We recommend not fewer than 12 50-ft. films with each outfit.

**Outfit No. 1, for exhibitors' use:**

Edison Projecting Kinetoscope, complete for electric light;  
12 Standard Edison 50-ft. Films;  
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50 extra Lamp Carbons, imported.

Price, \$300.

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Same as No. 1, but with complete Calcium Light Outfit in addition so as to use the machine anywhere independent of electricity.

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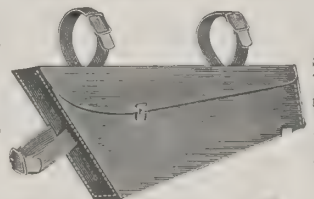
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IT allows the hands to rest on a perfect spring, and while it yields to the pressure of the hands, it does not in the least interfere with the positiveness in steering or guiding the wheel.

IT contributes ease and comfort while riding, by entirely overcoming any jar, jolt, or shaking of the hands and arms.

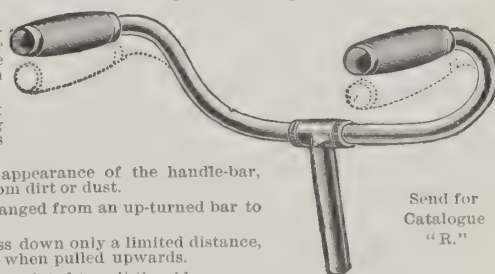
IT does not detract from the neat appearance of the handle-bar, being inclosed in a cylinder and free from dirt or dust.

IT is reversible, and can be easily changed from an up-turned bar to a drop bar.

IT is so constructed that it will press down only a limited distance, and then becomes rigid. It is also rigid when pulled upwards.

The tension of the spring can be regulated to suit the rider.

**A. C. GOODENOUGH, Rochester, N. Y., U. S. A.**

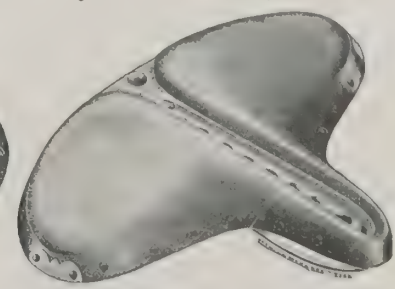
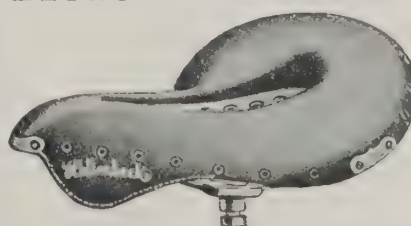


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### The Photo-Micrographoscope.

DR. ELMER GATES, the well known scientist of Washington, has perfected an apparatus which he styles his photo-micrographoscope. It is, as its name suggests, a clever combination of camera and microscope, so constructed that by working in unison the most startling results have been produced.

When it is stated that while the working limit of the best microscope in use up to the present has been about 10,000 diameters, the extemporized apparatus used by Dr. Gates magnified an object 3,000,000 diameters, an idea may be had of the tremendous significance of this discovery. Dr. Gates expresses confidence, too, that magnification to 100,000,000 diameters is easily possible.

Were it not for Dr. Gates's high reputation as a scientist this would seem like the dream of a visionary, but the professor is a man already so well known to fame that he will always command a respectful hearing.

The first principle of the new instrument consists in applying the focus of the objective of a second microscope to the plane of the real image of the first microscope so as to magnify, as though it were the original object, a very small selected portion of that real image; the second principle consists in separating the lines and markings of the first real image to a greater distance apart than the ten thousandth of a millimetre before photographing, so that these markings may be resolved by the retina or the sensitive film; and the third principle consists in depriving the interior of the second microscope and camera of all dust particles and aqueous vapor, so that by catching and diffusing the rays of light they do not photograph themselves more conspicuously than the details of the image.

And finally, the entire process must take place within a room from which all luminous and ultra-violet actinic rays are excluded. This is necessary if powers higher than a sixth-inch objective are used upon the microscopes.

Referring to the apparatus, Professor H. H. Doubleday, corresponding secretary of the American Microscopical Society, said: "I have visited Dr. Gates's laboratory and have witnessed some of the experiments he has made. Of course, one must not grow enthusiastic over a discovery, for it may resemble a pendulum which swings far to one side when it starts, but, if left alone, finally has a much smaller arc of travel than its initial stroke indicated. But I am inclined to think he has struck a new lead."

Dr. William T. Harris, Commissioner of Education, stated: "If Dr. Gates has actually attained the results which he claims by his photo micrographoscope the whole study of micro-organisms will be revolutionized. I received to day from Dr. Gates a photograph of a diatom magnified by his process, he tells me, 360,000 diameters. It is a wonderful and beautiful result, and I doubt not is the picture of a section of a detail of the diatom hitherto invisible by any microscopic power.

"If the new application of microscopy and photography succeeds in preserving definition in high magnifications a result has been reached which has long been sought after and has become to be regarded as well nigh unattainable. By its uses, I should imagine, the researches into cellular life which may be possible will be practically unlimited. It is possible that it might materially aid our researches in astronomy, which have heretofore been fruitless after a certain point."

### A Bullet-Coating Solution.

THE discovery of a secret solution by which leaden bullets may be coated so as to render them superior to steel-cased bullets is announced by Charles W. Bales, a chemist, and Edward Gerry, a surveyor, of Springfield, Ill. The ordinary leaden bullets, when used in the Krag-Jorgensen rifle, have been found to be too soft, and the lead has clung to the barrel of the rifle until the barrel was finally clogged, and the steel cartridges which have succeeded the lead ones have eventually torn the barrel—faults not found in the new article. In pursuing their experiments these inventors, it appears, succeeded in procuring some of the smokeless powder used by the Government in the Krag-Jorgensen rifles, making numerous tests with their cartridges, and with results showing the remarkable efficiency of the new and secret preparation. Thus, at a distance of 30 yards, they bored a hole through an axe blade, and also through a flat iron; in this latter case the bullet lodged in a tree, entering a distance of 6 inches.

### Machine for Sealing Envelopes.

THE Treasury Department is giving a trial to a new machine for sealing envelopes. If the contrivance proves a success it may be put into regular use throughout the Department. The machine is not complicated. It works something like a printing press. The envelopes are fed into rollers, one of which is moistened from a small trough of water through which it revolves. A small folder closes the envelope, which then passes through two other rollers and is pressed, falling into a receptacle. The machine is run by a small dynamo, or by a pedal like a sewing machine. It is claimed that it will seal 250 envelopes per minute if the operator is expert.

—This is a fair illustration of the different kinds of merchandise an ocean steamship carries from the United States to foreign ports. The other day the Johnston line steamer Vedamore loaded at the Locust Point docks of the Baltimore and Ohio Railroad, at Baltimore, 66 cars of lumber, 4 of starch, 19 of oil cake, 6 of provisions, 1 of organs, 1 of flour, 22 of tobacco, 2 of wire, 3 of sugar, 13 of fresh meat, 20 of sheep (or 1,699 head), 45 of cattle (or 888 head), 3 of lead, 1 of copper, 4 of merchandise and 161 of grain; making a total of 371 carloads.

### A New Surgical Lamp.

A NEW surgical lamp has been devised, which has been found of great practical value and convenience in ophthalmic work. It is made to fit to a frame resembling somewhat a pair of spectacle rims held in place by a bridge over the nose and a pair of tempered wires extending round the back of the ears. The following description is taken from the *Electrical Review*: "The lamp, which is 1 inch in diameter, is circular, flattened from before backwards, and perforated by a central aperture about  $\frac{1}{4}$  inch in diameter; the filament completely encircles this aperture. The back of the lamp is silvered and blackened round the central hole behind, and to avoid any unpleasant radiation of heat to the eye the back is further protected with non conducting asbestos material. A small transformer is required for use with the alternating current, the lamp working best at about 23 volts. At present this lamp has been tried in two forms: (1) attached to a handle provided with a switch, and (2) fitted to a laryngoscopic frame, in which it is hinged to the bridge so as to be readily adjustable for either eye; a switch is fixed to the right side of the frame, which can be turned on or off by the slight movement of a small milled head. The advantages of this lamp consist in its lightness as compared with a laryngoscope mirror, of which it takes the place, and more especially in its rendering the usual bracket lamp unnecessary, thus obviating the frequent adjustment of this and of the mirror, which is generally required, for the lamp once fixed satisfactorily in the line of vision needs no further alteration, whatever the movements of the observer or patient. The uses to which this lamp can be put are many; the most important are for indirect ophthalmoscopic examination (here the laryngoscope frame is very convenient, for it leaves the hands free), for laryngoscopy and for examination of the ear and nose. It is also applicable to the urethroscope.

### A New Lock Nut.

A HOLD-FAST or lock nut of some merit appears in the shape of a clever device of a Philadelphia inventor. The device consists of a nut having a groove on the inner face and a steel staple which fits into the groove. In use the nut is screwed home on the bolt, the staple inserted in the groove and driven down to bind upon the bolt. The staple being of steel and harder than the thread of the bolt, cuts or slightly flattens one thread on each side and binds the surface against which the nut is screwed.

It is stated that the binding of the staple and the slight cutting of the thread on the bolt creates a positive and reliable lock without a possibility of the nut turning or working loose, also that the staple does not injure or weaken the bolt and may readily be withdrawn when required. The nut may be used in connection with the ordinary spring washer when it is desired to provide against expansion or elongation of the bolt.

### American Competition.

THE *Ironmonger* of London, in its issue of September 25th, contained the following paragraph relative to American competition: "I cull two or three items in further proof of the existence and growth of American Competition. Here they are: 'The British bark Baldwin has sailed from Philadelphia with material for two locomotives and tenders, complete, from the Baldwin Locomotive Works for conveyance to Paranagua, Brazil. A further shipment of locomotives is to be made shortly to the same place. The British steamer Bramble has arrived at Philadelphia for a cargo of locomotives and structural machinery for conveyance to Mariopol, Russia. The British steamer Titania is sailing from Baltimore with 1,800 tons of steel rails, the first cargo of that sort ever shipped to South Africa from the United States.'"

### The Canning Industry of the United States.

THE United States' canning business consumes annually some 600,000,000 sheets of tin, in which the common fruit can takes up two-thirds of the entire product. This brings the fruit season in close touch with the tin plate industry, and as the present season has been one of exceptional abundance, it will make its mark on the home demand for plate. The can making industry is one of increasing importance, and its demands have evolved some special lines of automatic machines. In New York, Chicago, Baltimore, etc., automatic machines are employed having a daily capacity of 40,000 cans. In this special form of tin consumption, that is likely to increase rather than diminish, the American producer has a broadening market.

### Feat of an Engraver.

UNLESS a person saw with his own eyes through a powerful magnifying glass the words of the Lord's Prayer engraved on the head of an ordinary pin, he might be inclined to regard with skepticism any statement that the thing could be done. Yet it has been accomplished by a Boston engraver, Joseph F. Young. Three years ago Mr. Young amused himself by engraving the Lord's Prayer on a plate easily covered by the circumference of a lead pencil. Through the glass the letters are as distinct as ordinary newspaper type. Two weeks ago he began to engrave the words of the prayer on a pin head, and found it easy work. The lettering starts on the edge rim of the pin head and circles around in a spiral until it finishes in the centre. Every word is distinct, and the letters show surprising delicacy of touch. With the naked eye the characters are merely scratches.





**SIMPLY MILK**, as pure, rich and natural as it is obtained from the cow, treated with neatness and cleanliness, reduced by evaporation to a cream-like fluid and freed by sterilization from all possible germ life. Such is

## Highland Evaporated Cream.

As it is not combined with cane-sugar or any other foreign substance, and as it may be readily diluted with water to any desired strength, it fills every purpose of either fluid milk or cream. It is particularly valuable as food for infants and invalids. It is attractively labelled. It never thickens or spoils while sealed in the can. In the open state it keeps sweet from 12 to 24 hours longer than fluid milk.

GOLD MEDAL by Universal Exposition at Paris in 1889.

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Send for prices and particulars, either direct or through your commission house.

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Send for catalogue.

Special attention given to export orders.

Correspondence solicited in any language.

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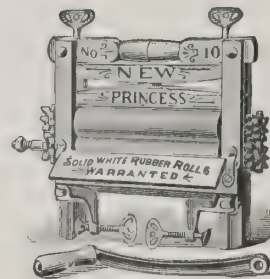
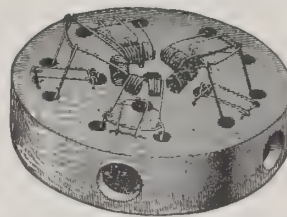
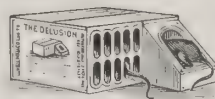
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## Clothes Wringers,

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**OOZE CALF.**

A very soft leather in unfadable colors, peculiarly adapted for wear in warm countries.

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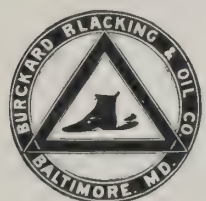
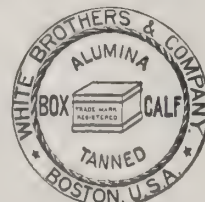
A bright-finished black leather of extraordinary wearing qualities. Never hardens or cracks.

Both of the above leathers are especially suited for shoemakers in the Colonies and Mexico.

Send for full information direct or through your commission house

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## THE BURCKARD BLACKING AND OIL CO.

BLENDERS OF OILS AND MANUFACTURERS OF

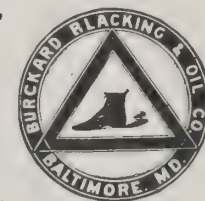
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NONE GENUINE WITHOUT TRADE MARK.

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No. 453. Phaeton with seat over dash.

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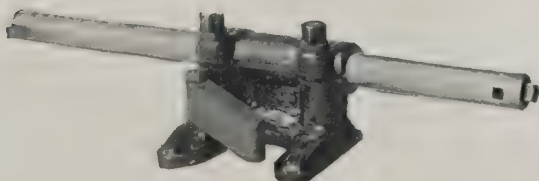
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**THE HUGH HILL TOOL CO. Anderson Ind., U. S. A.**



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### New Catalogues.

—THE E. P. BRECKENRIDGE COMPANY, Toledo, Ohio: "Klondike," "Imperial," and "Light Weight" bicycle lanterns, general catalogue and price list for 1898. This catalogue is devoted to an illustrated description of the company's bicycle lanterns in the three styles named. The merits and particular features of each lamp are concisely and graphically set forth.

—THE DUFF MANUFACTURING COMPANY, Allegheny, Pa.: Barrett patent compound lever, track and oil well jacks. An illustrated catalogue containing concise descriptions and price list of the company's specialties in trip and lowering jacks. They are shown in some thirteen different designs and sizes, and each tool is described and illustrated. A page is devoted to a list of differential screw jacks, and all repair parts are so tabulated and numbered as to obviate the danger of mistakes in ordering.

—THE MURRAY IRON WORKS COMPANY, Burlington, Iowa: General catalogue of No. 29. An interesting illustrated pamphlet, covering a description of ice or refrigerating machines and engines in five different sizes and designs. They are classified as A, B, C, D and E machines, each of peculiar construction and capacity varying from one to twenty tons. There is also a treatise upon ammonia valves and fittings, condensers, brine tanks, coils and circulating pipes. Suitable engines and boilers and small refrigerating machines are also enumerated. The book contains, in addition, a fund of general information that will be found useful to ice manufacturers and other interested parties.

—THE WILSON LAUNDRY MACHINERY COMPANY, Columbia, Pa.: An illustrated catalogue for the season of 1898 shows steam laundry machinery composed of Columbia improved washing machines in different styles and sizes, tumblers, rubber roll wringers, self blanching extractors, collar, cuff and shirt starchers, dampening machines and presses, mangles and ironing machines for various purposes, collar and cuff turning machines, etc. Hand machinery is also shown, as well as washers, stationary tubs, wringers, flatirons and all other requisites for laundry use; even stoves, engines, boilers and pumps are not omitted. The list for laundry purposes is very complete.

### Steel Tapes.

STEEL tapes for measuring are made in lengths ranging from three feet to a thousand feet. Tapes of a thousand feet in length are made only one-eighth of an inch in width, so as to save weight, and are usually made to order. Tapes of great lengths are used in bridge and railroad work, and in measuring across streams. Sometimes two 1,000 foot tapes are joined in measuring.

The steel in a measuring tape, of course, expands and contracts with heat and cold, just as steel would in any form. In a fifty-foot tape the difference in its length would amount to about three eighths of an inch in a range of 60 degrees of temperature. There are now made standard fifty-foot tapes that have thermometer attachment and a bubble. This contrivance is attached to one end of the tape. Attached to the thermometer is a sliding scale, with markings like those on the tube of the thermometer. If the temperature is, say, 62 degrees, the sliding scale is set to the corresponding mark and held there by means of a sliding collar with a clamp. With such an attachment the tape is made to measure exactly fifty feet. The bubble is to show whether the tape is level or not. Tapes of this sort are used in cities and where land is very valuable, and where measurements are made down to eighths of an inch.

The use of steel tapes is increasing. They are mounted in great variety; of the sizes most used great numbers are sold. Formerly 90 per cent. of the steel tapes used in this country were imported from England and Germany; now the greater number are made here. The tapes made here are better than those imported.

### Cost of Trolley Power.

A TABLE taken from the annual reports of the Railroad Commissioners of New York and Massachusetts for nearly all of the street railway properties shows the cost of the electric power required to run a car one mile under average conditions of load, etc. The table gives the number of cars owned, the car mileage per year and the cost of the electric power per mile and per passenger. Of the nineteen companies operating less than 250,000 car miles, four are obtaining power at a cost of less than 2 cents per car mile, six between 2 and 3 cents, five between 3 and 4 cents, one between 4 and 5 cents, and three at more than 5 cents; of the five companies operating over 5,000,000 car miles per year, one obtains the power at less than 1 cent per car mile, three between 1 and 2 cents, and one between 2 and 3 cents; other similar figures are also given between these limits. The Brooklyn Heights Company has the cheapest power, 0.86 per car mile, followed by the Binghamton with 0.94. The cost of power for Massachusetts roads includes repairs and depreciation of the station plant, which is not the case of the New York roads.—*Street Railway Journal*.

—A massive new electric crane has just been placed in position at the Star Tinsplate Works, Philadelphia. The crane is of 15 tons capacity, 45 feet span, lift of 21 feet and weight 58,000 pounds. The crane was placed in position, wired and ready for use in the short time of three and a half hours.

—The Knapp roller boat, of which a description was given in the October issue of THE EXPORTER, has been put at last to a practical test. To the surprise of the vast majority its mechanism worked smoothly and without the least oscillation. It failed, however, in accomplishing the main feature for which it was intended. Instead of acquiring a speed of miles an hour, the new boat in a calm sea could not average over 6.

### Some New Inventions.

J. C. AYERS, of San Francisco, is the inventor of a refrigerating apparatus which will be serviceable where ice cannot be obtained. It consists of a rectangular frame with corner posts, which extend into a pan containing water to prevent the ingress of crawling vermin. The exterior is covered with several thicknesses of burlap cloth, kept constantly moistened by the drippings from a perforated pipe connected with a thin metal water receptacle on top of the refrigerator. An inner compartment of wire, latticework, or perforated metal allows a current of air to pass between the two walls and through shells for the reception of food or other articles, the temperature being reduced sufficiently to prevent fermentation or decomposition.

An improved spring bottom for beds, designed by A. H. Freese, of Boston, Mass., has pivoted hooks at the ends, which are attached to the head and foot rails, thus removing much of the weight usually borne by the side rails and preventing sagging.

A lamp extinguisher, invented by a Philadelphia German, is so constructed that when the wick is lowered below the top of the tube the extinguisher covers the tube, preventing all smoke and disagreeable smell.

### The Smallest Engine in the World.

SAN FRANCISCO, Cal., claims to have the smallest engine in the world. It is only 40½ inches long, generates its own steam power and is a perfect little racer. It was made by Gustave Schier, a machinist employed by the Western Sugar Refinery. Schier is a German by birth and has lived in this country twelve years, eight of which he spent in the Atlas Iron Works.

This little engine has a boiler 3½ inches in diameter, 14 inches in length, made of ⅛ inch copper. It has fifteen tubes ⅝ of an inch in diameter on the inside, which are 8½ inches in length. The boiler has an asbestos covering with an air covering of Russia steel the same as a regular engine. The fire box is 3½ inches wide and 3½ inches deep. The boiler is tested to 150 pounds pressure and is supplied with water by two pumps, one on each side, which can be worked separate or together. There are three gauge cocks, a gauge glass and throttle valve connected with the dome.

The cylinders are of 1 inch bore and have a 1½ inch stroke. There are four drive wheels, 3⅝ inches in diameter, four truck wheels, 1½ inches in diameter and eight tender wheels of the same proportion. Tender wheels have an automatic brake on each. The engine is reversible. It is 7 inches wide and 12 inches high to the top of the whistle, built on a scale of ¾ of an inch to the foot. The weight of the engine is 46½ pounds without fuel and water. It carries one half gallon of water in its tank.

This engine contains 2,500 pieces, not counting the rivets in the boiler and tank. It required eight years to build it, working on an average of four hours a day. It is pronounced by experts as being one of the most remarkable pieces of hand mechanism in existence to-day.

### Scrap Tin.

THERE is a very large and steady movement of tin scrap from the Atlantic Coast to Europe, according to a New York broker, in scrap metals. The amount of tin plate clippings made by the large tinware and can-making factories of the country is very considerable. Some of the more extensive works in this line put out from 50 to 100 tons of scrap tin monthly. This material, in most instances, is sold to exporters under a yearly contract. It is baled at the factory and shipped to Antwerp, from whence it is sent to a separating works in Holland, where, by a special process, the tin is recovered and made into pigs, while the steel scrap is sold for various purposes. The average value of the tin-plate scrap, in bales, delivered at the dock in New York is about \$5 a ton. Some of the smaller tinware factories which have no facilities for bailing their scrap, dispose of it loose to the manufacturers of sash weights.

THE American barque Mary Harbrouck has been chartered by a Philadelphia concern to carry a full cargo of water pipe to Auckland, New Zealand. This is the first exportation of the kind from Philadelphia, but other shipments are now expected to follow. For some time past negotiations have been pending looking to the exportation of water pipe to Great Britain and the Continent. It has been determined that Americans can compete with the world in this particular line, and land pipe in various foreign countries at lower figures than it can be manufactured there.

—J. W. Graham, of the Southside, has just completed an invention which will be of great value to railroad men. It consists of a steam whistle such as are used on passenger railroad trains, but which can be applied to freight trains as well. By a system of signals direct communication can be had between the crew and the engineer, and the new device will do away with lantern and arm signals entirely. Several of the local railroads are already preparing to adopt the signals.

—American electrical apparatus is not only pouring into England and the Continent in large quantities, but is more and more finding its way into the colonies and tropical regions generally. All through the West Indies, South America, South Africa, the straits settlements, China and Japan American systems of lighting and traction are now in operation, and the demand comes briskly for a variety of smaller material.





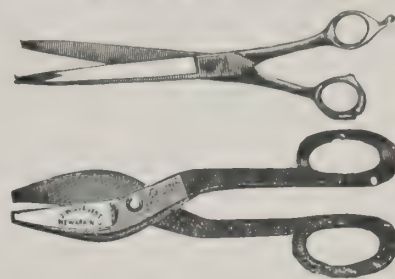
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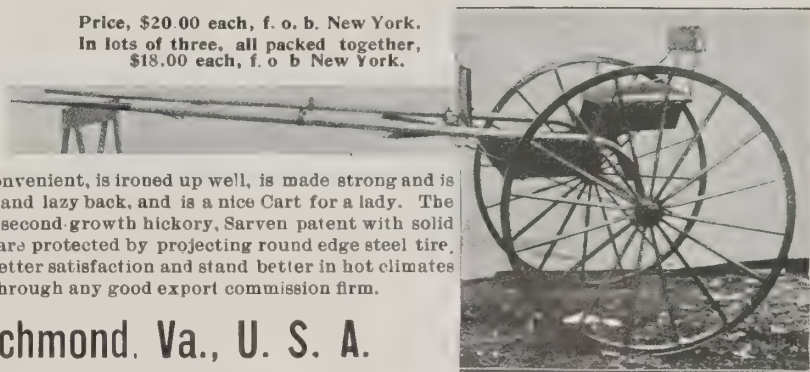
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For rough roads there is no superior at the price. It is an easy riding Cart and very convenient, is ironed up well, is made strong and is well finished. Has a good large box under the seat for bundles and packages. Has cushion and lazy back, and is a nice Cart for a lady. The gearing is the best of hickory, the axle is solid steel and has double collars. The wheels are second growth hickory, Sarven patent with solid sand bands attached, the wood hub being entirely covered with iron. The felloes of wheel are protected by projecting round edge steel tire. This Cart is homemade of Virginia timber well seasoned in this climate, and will give better satisfaction and stand better in hot climates than others made in the North and West. Correspondence solicited. Shipments direct or through any good export commission firm.

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Price, \$20.00 each, f. o. b. New York.  
In lots of three, all packed together,  
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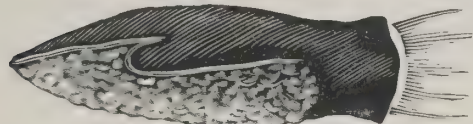
**NASHUA SADDLERY HARDWARE COMPANY,**  
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Harness Saddle Trees (in iron), Gig, Track,  
Coupe, Express. All styles and sizes.

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Brass, Nickel and Imitation Rubber Finish.

THE HANDY.



TRADEMARK.

## SHEEP SKIN MITTEN,

Acknowledged to be the best article for **POLISHING STOVES**, as it does away with the old-time dirtiness of the work, making this work a pleasure. Also invaluable for polishing brass or glass, or silverware which it does not scratch. For tan shoes and cleaning bicycles it has demonstrated itself a conspicuous success.

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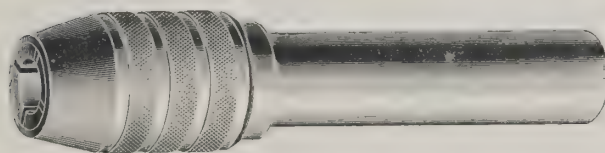
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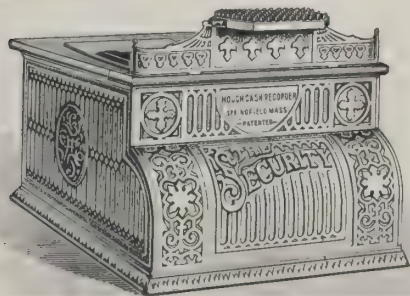
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**Also Chucks, Rose Reamers and Machinists' Tools.**

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However, until the "stop-action" of the "**Security**" was devised and patented, their accuracy was limited; oft-times an entry was forgotten and the cash over-ran when balancing, as it did previously when a counter book was used.

This is overcome by using the "**Security**," as you cannot open the money drawer and **forget** to make a record that **might** want to be referred to at **any** future time.

We manufacture twelve different styles. Write for illustrated catalogue and price lists.

**HOUGH CASH RECORDER CO., Indian Orchard, Mass., U. S. A.**

Twist Drills made by this Company are **HOT FORGED** by an Entirely New Process

Bit Stock Drills,  
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1/4 inch " "  
5/8 inch " "  
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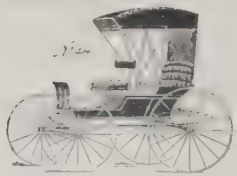


They are **TOUGHER** and **STRONGER** than the **OLD STYLE** Milled Drills.

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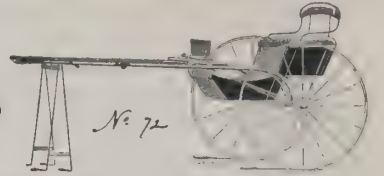
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Send for complete Catalogue.  
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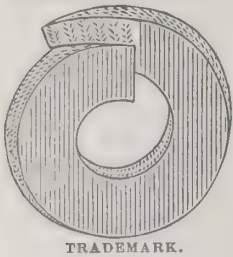
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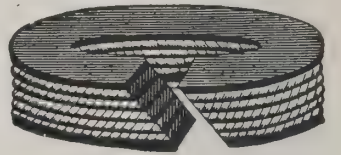
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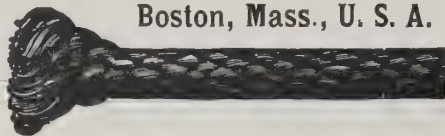


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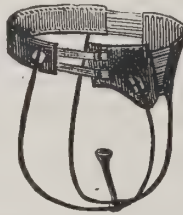
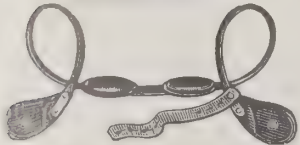
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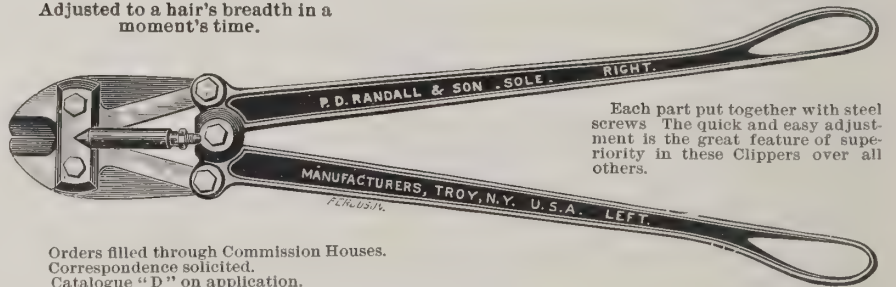
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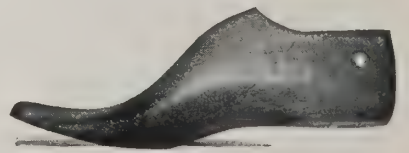
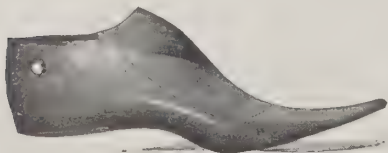
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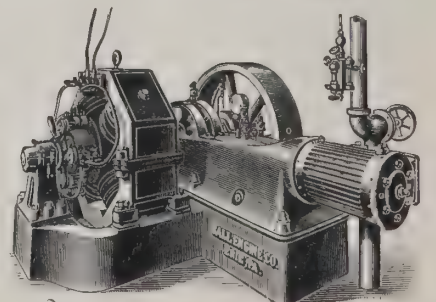
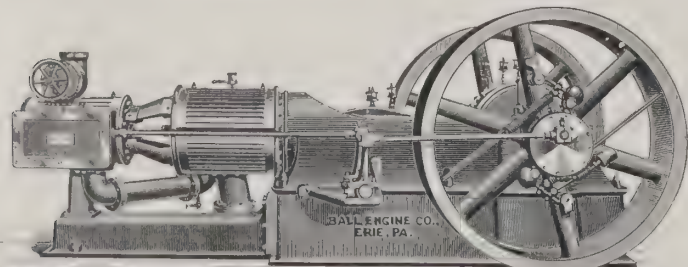
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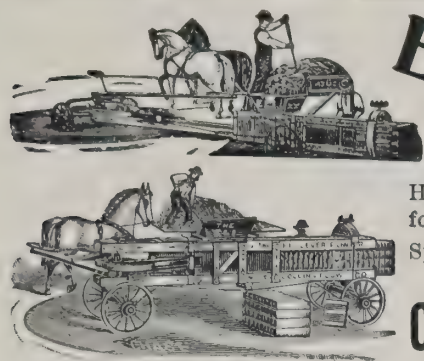
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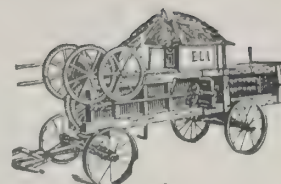
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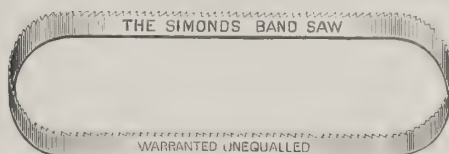


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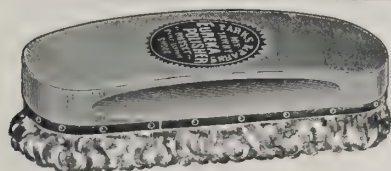
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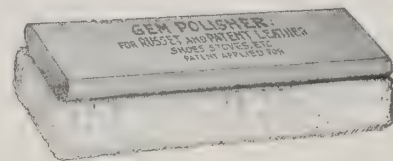


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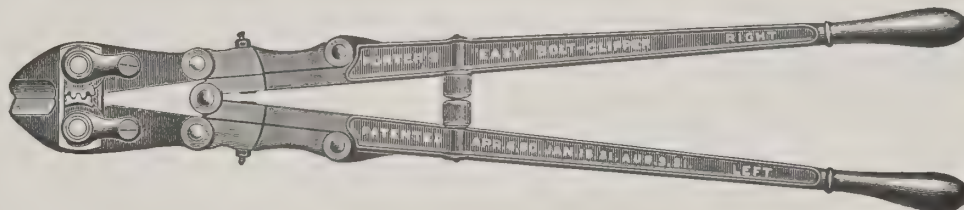


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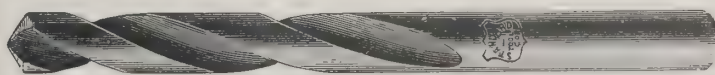
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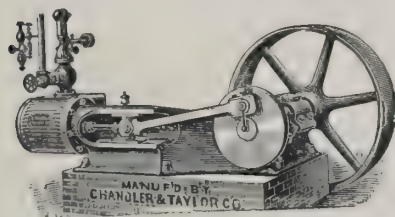
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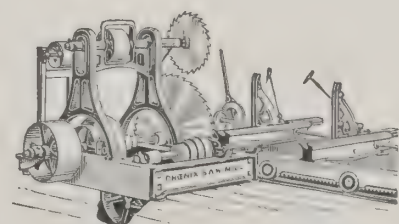
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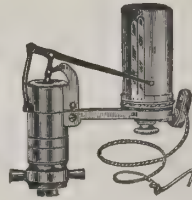
Safety Valve.



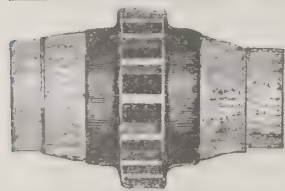
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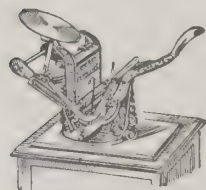


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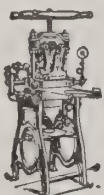


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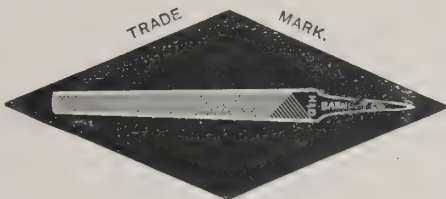
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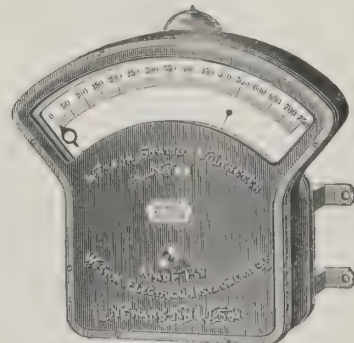
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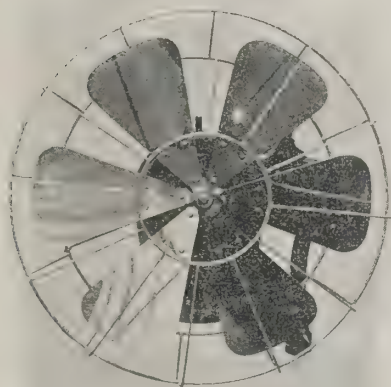




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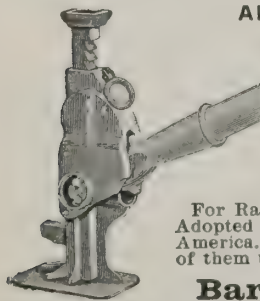
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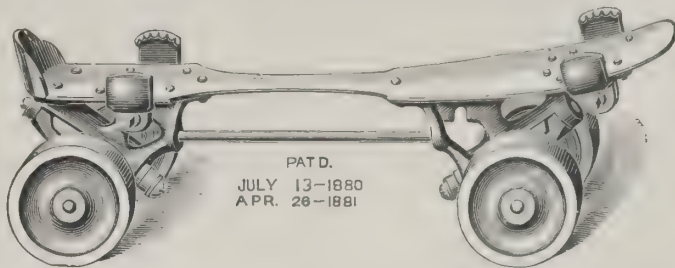
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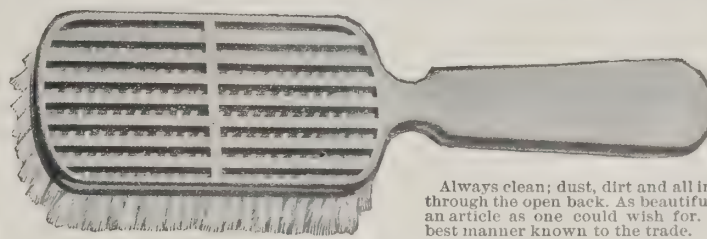
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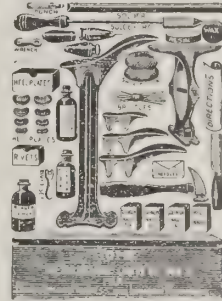
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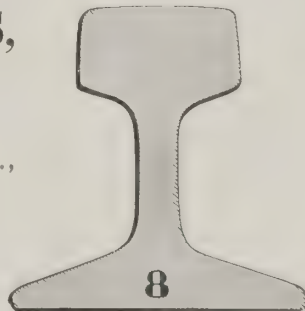
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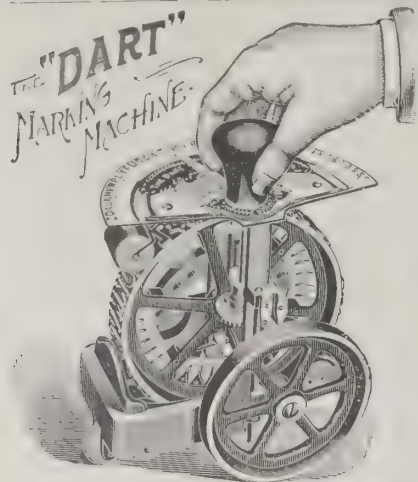
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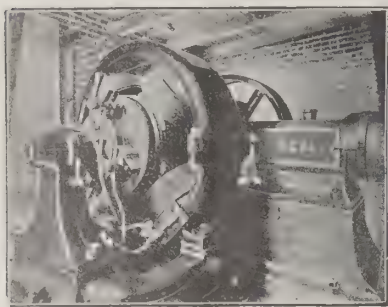
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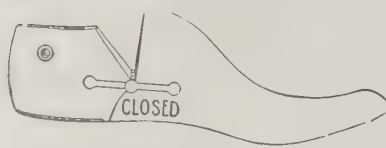
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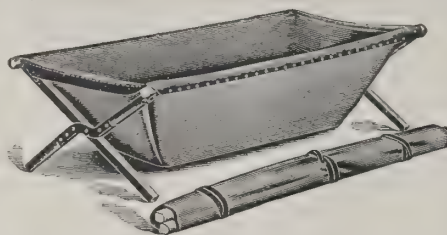
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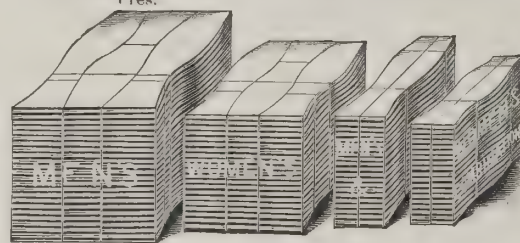
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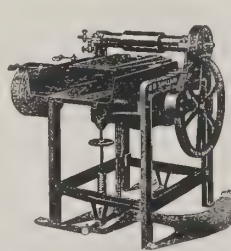
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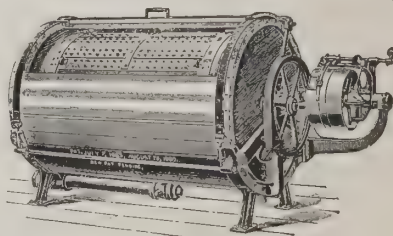
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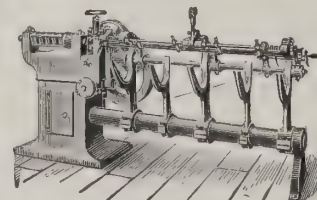
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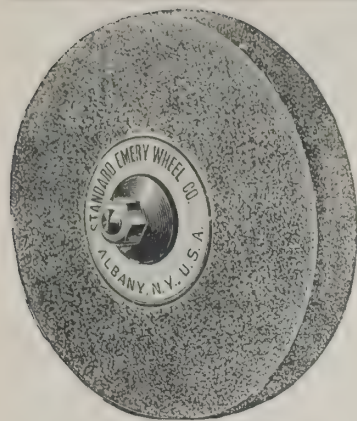
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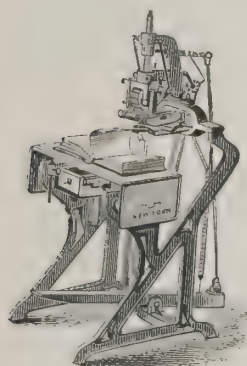
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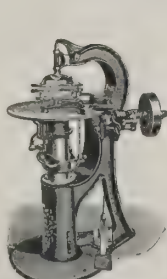
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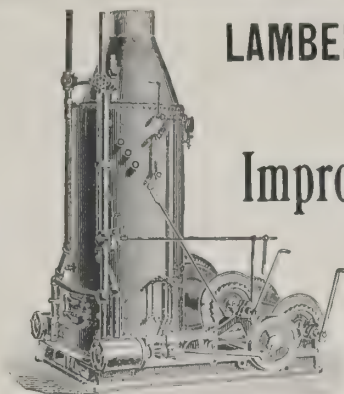
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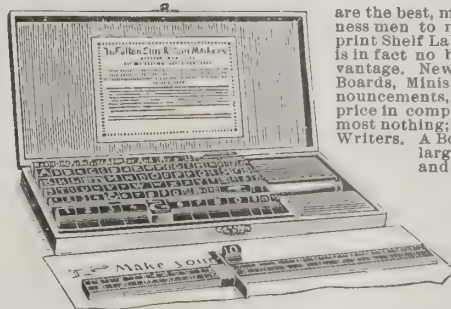
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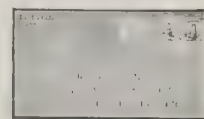
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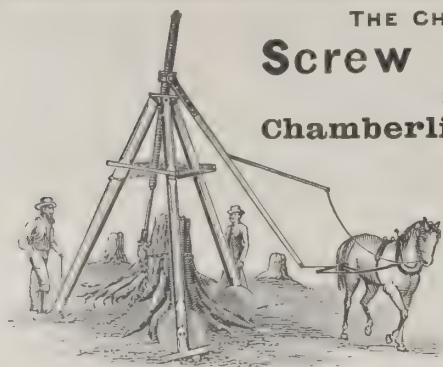
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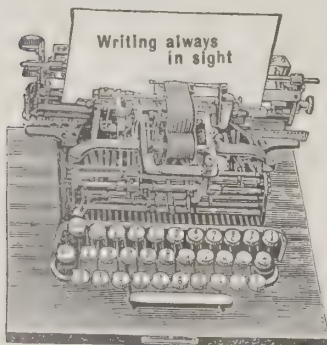
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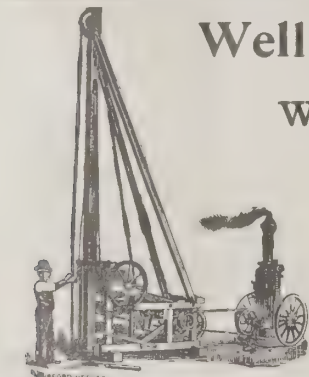
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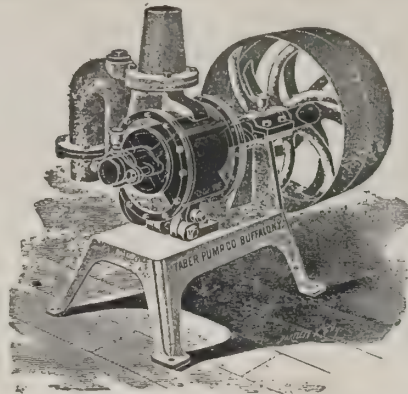
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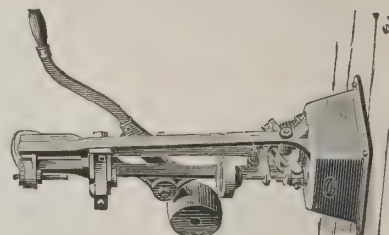
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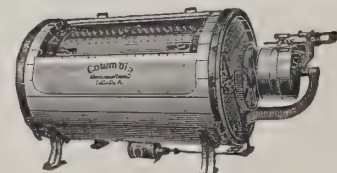
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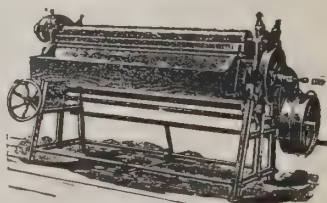
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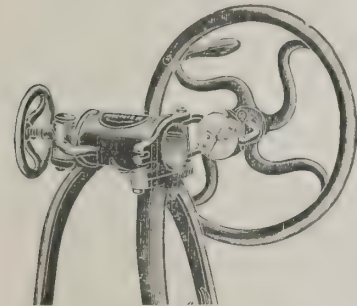
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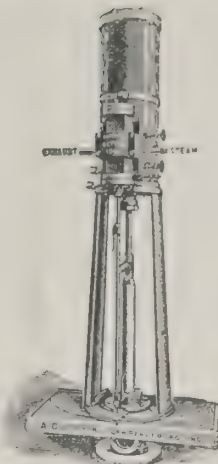
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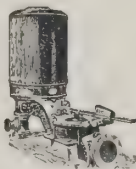
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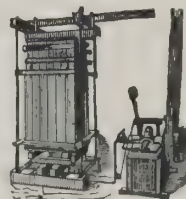
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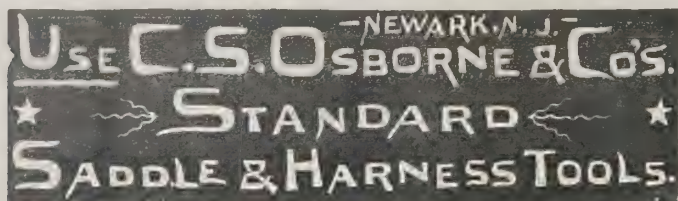
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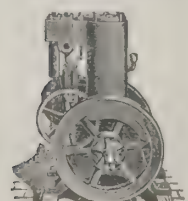
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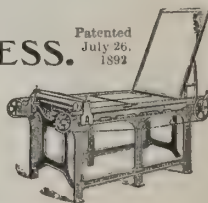
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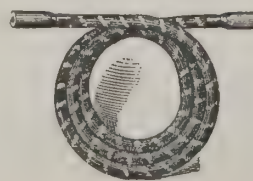
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